



Snap ServerTM 700i Series User's Guide

for Adaptec OnTargetTM-Powered Snap Servers

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About this Guide

When connected and configured as an iSCSI Storage Appliance, your Snap Server 700i Series contains storage space that can be shared by systems in an IP Storage Area Network (IP SAN).

Three software components are included with the Snap Server 700i Series:

- **Adaptec OnTarget™ operating system:** The Adaptec OnTarget software runs on an embedded version of the Linux operating system in the Snap Server 700i Series chassis. The Adaptec OnTarget software is primarily concerned with virtualizing physical disks as iSCSI volumes; however, it can also be used to create or manage the iSCSI storage through the Command Line Interface (CLI). It should be updated whenever the Adaptec Storage Manager software is updated. Refer to “Maintaining Your iSCSI Storage Appliance” on page 107 for instructions on updating the Adaptec OnTarget software.
- **Adaptec Storage Manager:** Use Adaptec Storage Manager (included on the Adaptec OnTarget User CD) to create and manage your iSCSI storage. You can also use Adaptec Storage Manager to monitor any GuardianOS-powered Snap Servers on your network, as well as any Adaptec direct attached storage (DAS) RAID controllers. Adaptec Storage Manager is installed on workstations and consists of three modules:
 - **GUI and agent:** The ASM GUI. Install it on laptops or workstations to access the ASM Management Service and manage storage remotely.
 - **Management Service:** Install it along with the GUI to add and manage your iSCSI Storage Appliances.
 - **Windows Support:** This includes additional modules for Windows 2003 systems that support automatic provisioning, mirroring, snapshots, and storage management using third-party VDS-aware tools.
- **Command Line Interface:** The Command Line Interface (CLI) software allows you to monitor and manage the iSCSI Storage Appliance. Use the CLI to create and manage iSCSI targets that appear as local disk storage on your server and use the event logging features to monitor the entire system.

Note In addition to the software components supplied with the Snap Server 700i Series, you must also have software to support your iSCSI Initiator, and when running on Microsoft Windows operating systems, Microsoft iSCSI Initiator must be installed. See “Configuring iSCSI Initiators” on page 163 for more information.

What's Included in this User's Guide

This *User's Guide* describes how to use Adaptec Storage Manager to configure your iSCSI Storage Appliance and create an IP SAN, modify and monitor iSCSI storage, maintain your iSCSI Storage Appliance, and monitor any GuardianOS-powered Snap Servers on your network. It also provides instructions for installing and configuring iSCSI initiators in the systems that will be accessing iSCSI storage.

For advanced users, this *Guide* also provides detailed instructions for using the iSCSI Storage Appliance's CLI (see page 179).

Additionally, this *Guide* describes the hardware features and specifications for your Snap Server 700i Series and S50 expansion array (see page 189).

Note For more information about using Adaptec Storage Manager with Adaptec direct attached storage, refer to the *Adaptec Storage Manager User's Guide for Direct Attached Storage* on the installation CD that came with your Adaptec DAS RAID controller.

What You Need to Know Before You Begin

This *Guide* is written for system or network administrators who want to create an IP SAN. Advanced knowledge of storage networks is not required, but you should be familiar with computer hardware, data storage, and network administration terminology and tasks, and have knowledge of Internet SCSI (iSCSI) and Redundant Array of Independent Disks (RAID) technology.

Terminology Used in this Guide

In this *Guide*, these terms will be used to differentiate between your Snap Server 700i Series and any other Snap Servers you may be monitoring with Adaptec Storage Manager:

- **iSCSI Storage Appliance** — Snap Server 700i Series or Adaptec OnTarget-powered Snap Server
- **GuardianOS-powered Snap Server** — Non-700i Series Snap Server

In this *Guide*, when the term 'Adaptec Storage Manager' is used, it refers to the graphical user interface (GUI) — the window that opens on your monitor when you run the software.

For efficiency, the term "component" or "components" is used when referring generically to the physical and virtual parts of your IP SAN, such as systems, disk drives, pools, and logical devices.

Many of the terms and concepts referred to in this *Guide* are known to computer users by multiple names. In this *Guide*, this terminology is used:

- Disk drive (also known as hard disk, hard drive, or hard disk drive)
- Logical device (also known as logical drive)
- System (also known as a workstation or machine)
- Enclosure (also known as a JBOD, disk enclosure, or storage enclosure)

Service and Technical Support

For an immediate response to a service inquiry, use our Expert Knowledge Base System at http://ask.adaptec.com/scripts/adaptec_tic.cfg/php.exe/enduser/home.php. Simply type in your question to view a list of possible resolutions to known issues. However, if none of the listed topics resolves your inquiry, you can forward the question to our Technical Support department who will then e-mail you with a response. To obtain additional service or technical support for your Snap Server 700i Series, call 408-934-7274.

Additional Resources

Resource	Description
Knowledge Base	Search for solutions to specific issues by clicking the Knowledge Base link on the Adaptec support page: http://ask.adaptec.com/scripts/adaptec_tic.cfg/php.exe/enduser/home.php
Hardware Components	Purchase additional hardware components from authorized Adaptec resellers. To locate a reseller in your area, select the Where to Buy tab on the Adaptec home page: http://www.snapserver.com
Field Service Documents	Find a list of the hardware components available for your Snap Server 700i Series or S50 expansion array and instructions for installing or replacing components by going to the Snap Server support page, clicking Documentation Center and then navigating to the server or expansion array model: http://www.snapserver.com/snap/en-US/Support/

Notes and Cautions

Conventions used to call out useful or important information are described below:

Note A note presents time-saving shortcuts related to the main topic.

Caution A caution alerts you to potential hardware or software issues or hazards in the configuration or operation of Snap Server 700i Series. Consider cautions carefully before proceeding with any operation.

Typographical Conventions

Convention	Usage
<i>Italic</i>	<ul style="list-style-type: none">• Emphasis• The introduction of new terms• File names• Settings you select or enter in the Administration Tool
Arial Bold	Navigational paths, command buttons, and navigational links.
Arial	<ul style="list-style-type: none">• Text you type directly into a text field, a command line, or a Web page• Buttons on a keyboard
<i>Arial Italic</i>	A variable for which you must substitute a value
Arial	Commands you enter in a command-line interface

Finding More Information

Product documentation related to the Adaptec OnTarget-powered Snap Server 700i Series and SANbloc S50 expansion array are listed below. The current versions of all

these documents are always available from <http://www.snapserver.com/snap/en-US/Support>.

Source and Location	Content
700i Series Quick Start Guide Product Packaging and Web	Details package contents, identifies server hardware components, and provides complete instructions for installing the server to a rack, connecting the server to the network, and configuring the iSCSI Storage Appliance. Also contains the EULA and warranty.
SANbloc S50 Quick Install Guide Product Package and Web	Details package contents, identifies expansion array hardware components, and provides complete instructions for installing the SANbloc S50 to a rack and connecting it to a Snap Server.
Snap Server 700i Series User Guide User CD and Web	Provides an overview of the configuration and maintenance of the Snap Server 700i Series, gives detailed instructions on using Adaptec Storage Manager to configure and manage your iSCSI storage, and provides hardware specifications for the Snap Server 700i Series and the SANbloc S50 expansion array.
Adaptec Storage Manager Online Help	
Readme.txt User CD	Contains late-breaking information, corrections, and known issues concerning the Snap Server 700i Series.
Field Service Documentation Service CD and Web	Provides detailed instructions for the replacement of disk drives, adapter cards, power assemblies, slide rails, and other hardware components.

Planning Your IP SAN

This chapter introduces the Adaptec Storage Manager software and provides a guide to planning your IP SAN configuration and setup.

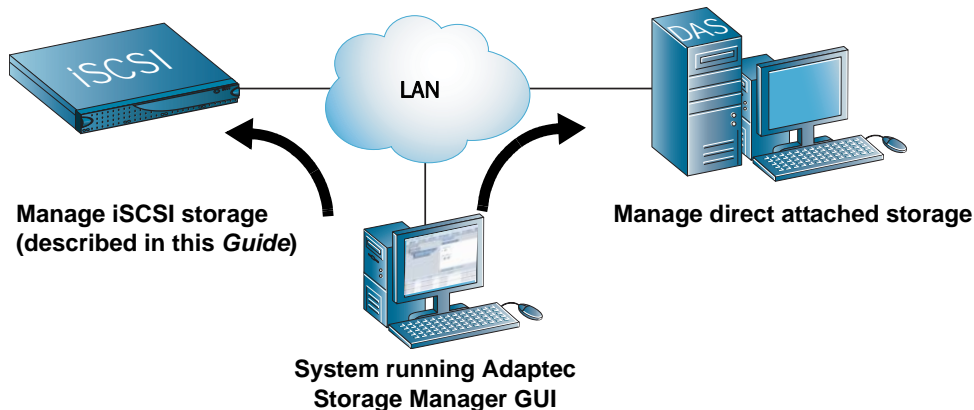
It also provides important instructions for using your iSCSI Storage Appliance on a network without a DHCP server.

Introduction to Adaptec Storage Manager for iSCSI Storage

Adaptec Storage Manager is a software application that helps you build and manage storage for your online data. From the 'one-view' user interface, you can use Adaptec Storage Manager to:

- Create, monitor, and manage iSCSI storage
- View and monitor any GuardianOS-powered Snap Servers on your network
- Create, monitor, and manage direct attached storage

This *Guide* describes how to use Adaptec Storage Manager to set up, monitor, and manage iSCSI storage, and monitor GuardianOS-powered Snap Servers.



You can use Adaptec Storage Manager to:

- Combine physical disk drives into virtual storage pools (*pools*) that are protected with RAID, and increase the capacity or change the RAID level of existing pools.
- Protect and control access to your IP SAN and data.
- Monitor your IP SAN, using activity notifications and the event viewer in the main window.
- Maintain your iSCSI Storage Appliances.
- Provision storage to the systems on your network automatically (supported on some operating systems only) or manually.
- Create application-consistent snapshots of provisioned storage, for extra data protection (supported on some operating systems only).
- Create synchronous mirrors of provisioned storage, for an extra layer of data protection and increased data availability (supported on some operating systems only).

Note Synchronous mirroring requires a minimum of two iSCSI Storage Appliances.

Adaptec Storage Manager provides wizards to guide you through many of these tasks.

iSCSI Storage Feature Support

Support for Adaptec Storage Manager's iSCSI storage features varies by operating system (OS)—depending on which OS is running on an individual system, either the full set or a subset of Adaptec Storage Manager iSCSI storage features is available on that system.

Additionally, the storage provisioning process may be automatic or manual for an individual system depending on which OS is installed.

Systems running Windows 2003 to which you provision storage are referred to in Adaptec Storage Manager as *iSCSI Storage Hosts*.

The table on page 15 lists the features available for a system running one of the supported OSs.

On a system running these OSs... You can...	
Microsoft® Windows Data Center 2003 Windows Server® 2003 (all versions) Windows Small Business Server 2003	Install the GUI to manage your IP SAN from a centralized location Provision storage to the system automatically Create application-consistent snapshots of storage provisioned to the system Create synchronous mirrors (with automatic failover) of storage provisioned to the system Adaptec Multipath Input Output (MPIO) Device Specific Module (DSM) Driver Use Adaptec Storage Manager with Microsoft Virtual Disk Services (VDS)
Windows® XP (all versions) Red Hat® Enterprise Linux 4 U5 Red Hat Enterprise Linux 5 SUSE Linux Enterprise Server 9 SP3	Install the GUI to manage your IP SAN from a centralized location Provision storage to the system manually Adaptec Multipath Input Output (MPIO) Device Specific Module (DSM) Driver
VMware® ESX Server 3.x.x	Provision storage to the system manually Note: No other iSCSI storage feature is currently supported by VMware.

Full Feature Set

Feature Subsets

Notes For simplicity, in this *Guide*, Windows Server 2003 (all versions), Windows Small Business Server 2003, and Windows Data Center 2003 operating systems are known collectively as ‘Windows 2003’.

Refer to the Adaptec Web site at www.adaptec.com for the most up-to-date list of supported OSs.

Understanding Adaptec Storage Manager's Main Components

During installation, you have the option to install up to three main components of Adaptec Storage Manager on a system:

- The GUI and Agent
- The Management Service
- Windows Support (see page 17)

Ensure that you understand the role of these components before continuing.

Note Component support varies by operating system. See page 211 for more information.

The GUI and the Agent

The *GUI* (or *graphical user interface*) is the window that opens when you run Adaptec Storage Manager. You build, monitor, and modify your IP SAN from the GUI.

The Adaptec Storage Manager *Agent* is a software component that runs in the background and communicates status and other information about any Adaptec direct attached storage on a system. The Agent requires no user intervention and includes no user interface.

The GUI and Agent must be installed on at least one system in your IP SAN. See “Installing Adaptec Storage Manager” on page 27 for more information.

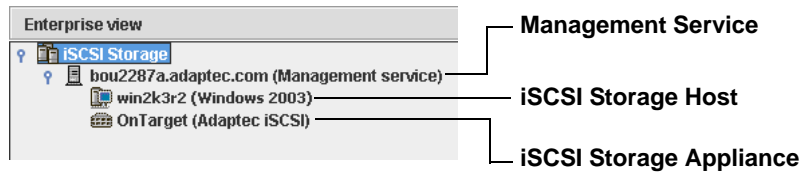
The Management Service

The *Management Service* is the software component that coordinates and enables communication between your iSCSI Storage Appliance and the iSCSI Storage Hosts on your IP SAN. The Management Service also:

- Monitors your iSCSI Storage Appliance and IP SAN.
- Generates event alerts when activity, errors, or failures occur.
- Controls access to Adaptec Storage Manager and your IP SAN.
- Monitors jobs in progress and can schedule jobs to occur at a future time.

Similar to the Agent, the Management Service runs in the background, requires no user intervention, and includes no user interface.

A Management Service manages and monitors only the iSCSI Storage Appliances and iSCSI Storage Hosts that are added to it in Adaptec Storage Manager. (In the main window of Adaptec Storage Manager, the iSCSI Storage Appliances and iSCSI Storage Hosts are listed under the Management Service, as shown in the figure on page 17.)



You must install the Management Service on at least one system on the same subnet as your iSCSI Storage Appliance. See “Installing Adaptec Storage Manager” on page 27 for more information.

Adaptec recommends that you install the Management Service on the same system as the GUI and Agent; however, it can be installed anywhere on your IP SAN, as long as it's on the same subnet as your iSCSI Storage Appliance.

Note You can install and add multiple Management Services to Adaptec Storage Manager, if you want some of your iSCSI Storage Appliances to be configured and managed separately from others. An individual iSCSI Storage Appliance can be added to one Management Service only.

Windows Support

Windows Support is a bundle of software components that's offered as an installation option for systems running Windows 2003 only. (Component support varies by operating system. See page 211 for more information.) Windows support includes:

- **Multipath Input Output (MPIO) Device Specific Module (DSM) Driver** — Supports multiple redundant physical paths between your iSCSI Storage Appliance and your iSCSI Storage Hosts, and supports mirror failover. Supported on systems running Windows 2003 R2 only.
- **Provisioning Agent** — Automates functions such as volume and snapshot creation. Supported on systems running Windows 2003 only.
- **Virtual Disk Services (VDS) Provider** — Enables third-party management tools to configure your iSCSI Storage Appliance. Supported on systems running Windows 2003.
- **Volume ShadowCopy Service (VSS) Provider** — Enables the creation of application- and file-consistent snapshots. Supported on systems running Windows 2003 only.

Windows Support must be installed on any system that will be an iSCSI Storage Host. Windows Support can be installed on any system that requires support for third-party management tools. See “Installing Adaptec Storage Manager” on page 27 for more information.

Planning Your IP SAN Configuration and Setup

As you plan your IP SAN, use this table to understand which Adaptec Storage Manager components can or must be installed on your IP SAN systems.

	Install...	On...	To...
Required	GUI and Agent	At least one system on your IP SAN	Build, manage, and monitor your IP SAN
	Management Service	At least one system on the same subnet as your iSCSI Storage Appliance (Adaptec recommends it be the same system as the GUI and Agent)	Build, manage, and monitor your IP SAN
Optional	Windows Support (see page 17)	All Windows 2003 systems on your IP SAN that will be iSCSI Storage Hosts.	Provision storage automatically, create volume snapshots, create synchronous mirrors, use Adaptec Storage Manager with non-Adaptec storage management tools

Note See page 211 for a complete list of supported Adaptec Storage Manager features by OS. For additional help planning your IP SAN, see “Sample IP SAN Configurations” on page 18.

Maximum Supported Connections

When building or expanding your IP SAN, ensure that you don’t exceed these connection limitations for your iSCSI Storage Appliance. To each separate iSCSI Storage Appliance, you can connect:

- Up to 100 Serial Attached SCSI (SAS) disk drives
- Up to 52 SATA II disk drives

Note Re-initialize any previously used disk drive that was originally initialized by another RAID controller before connecting it to your iSCSI Storage Appliance. Refer to your operating system documentation for instructions.

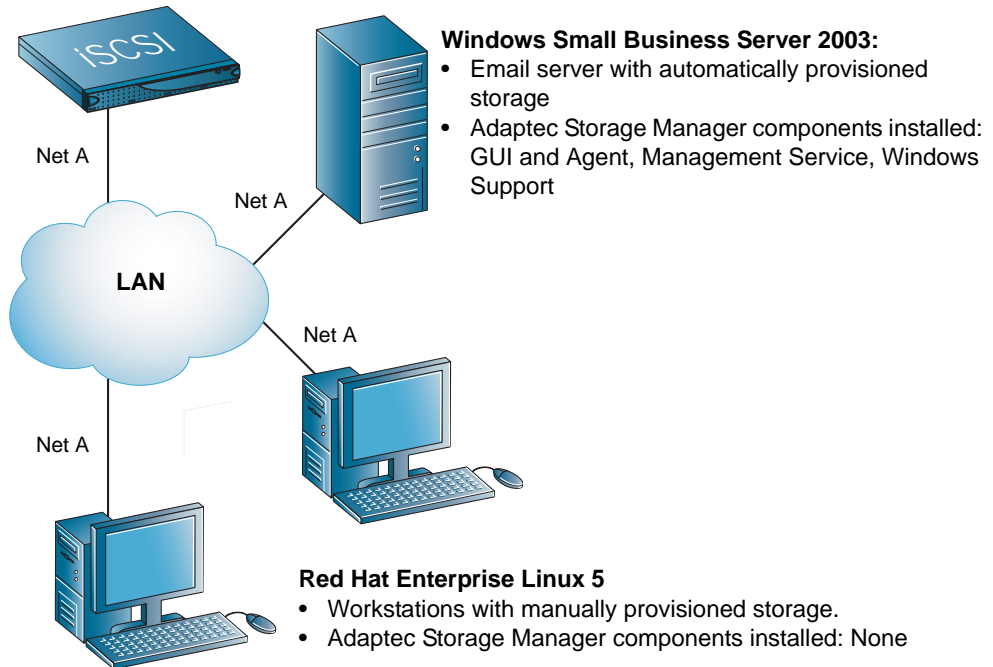
Sample IP SAN Configurations

This section provides configuration examples that illustrate the storage management options and Adaptec Storage Manager installation requirements for each option.

Basic Configuration #1

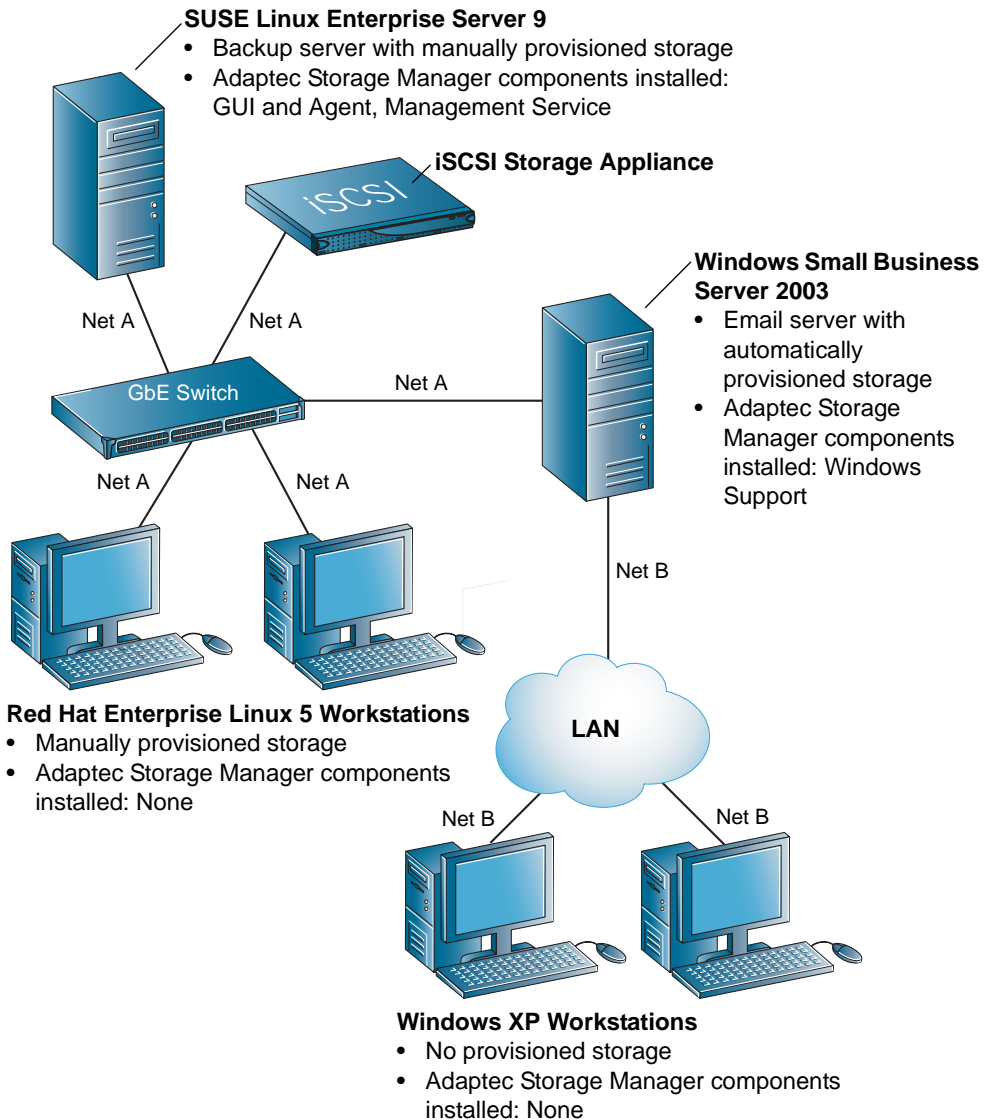
Note that because there is only one iSCSI Storage Appliance on this network, mirroring is not supported.

iSCSI Storage Appliance



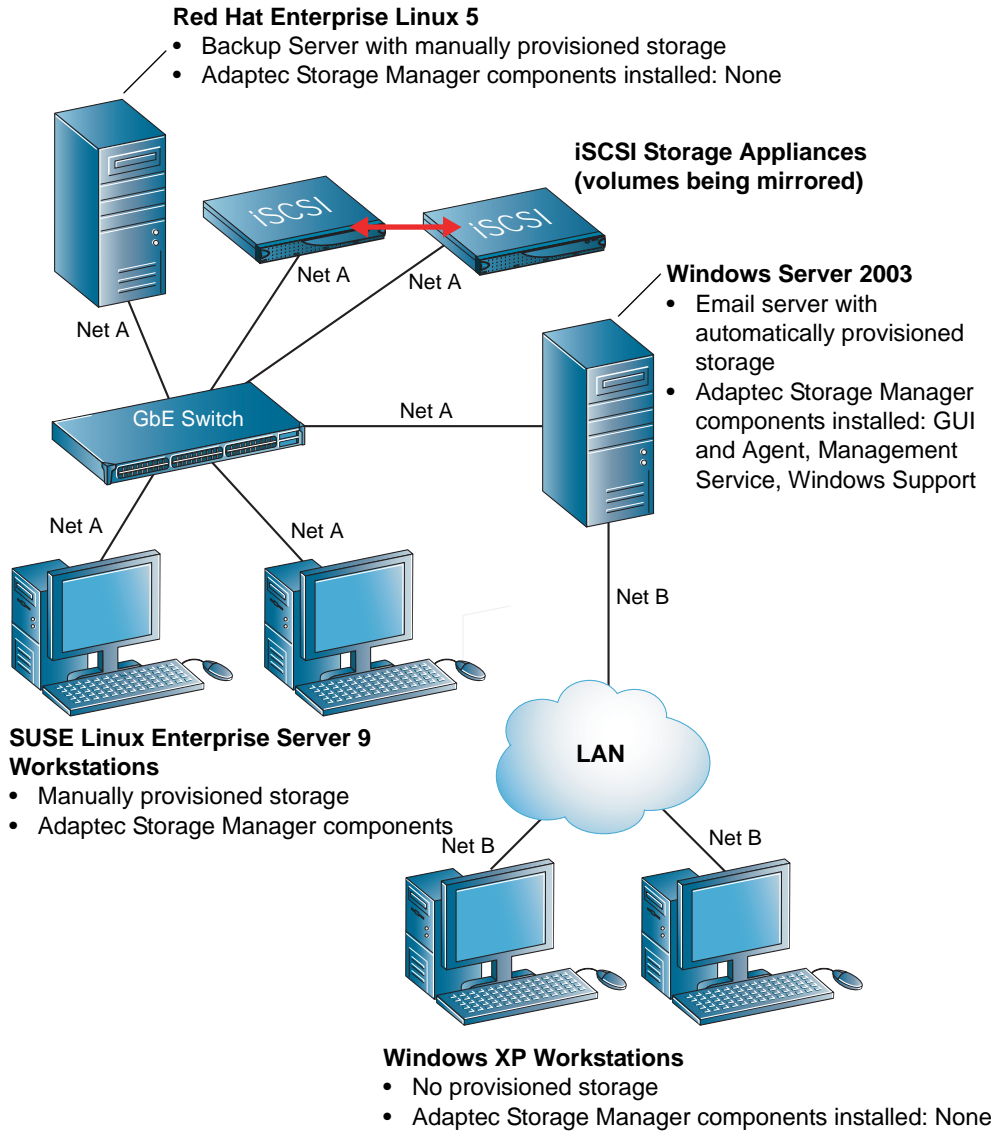
Basic Configuration #2

Note that because there is only one iSCSI Storage Appliance on this network, mirroring is not supported.



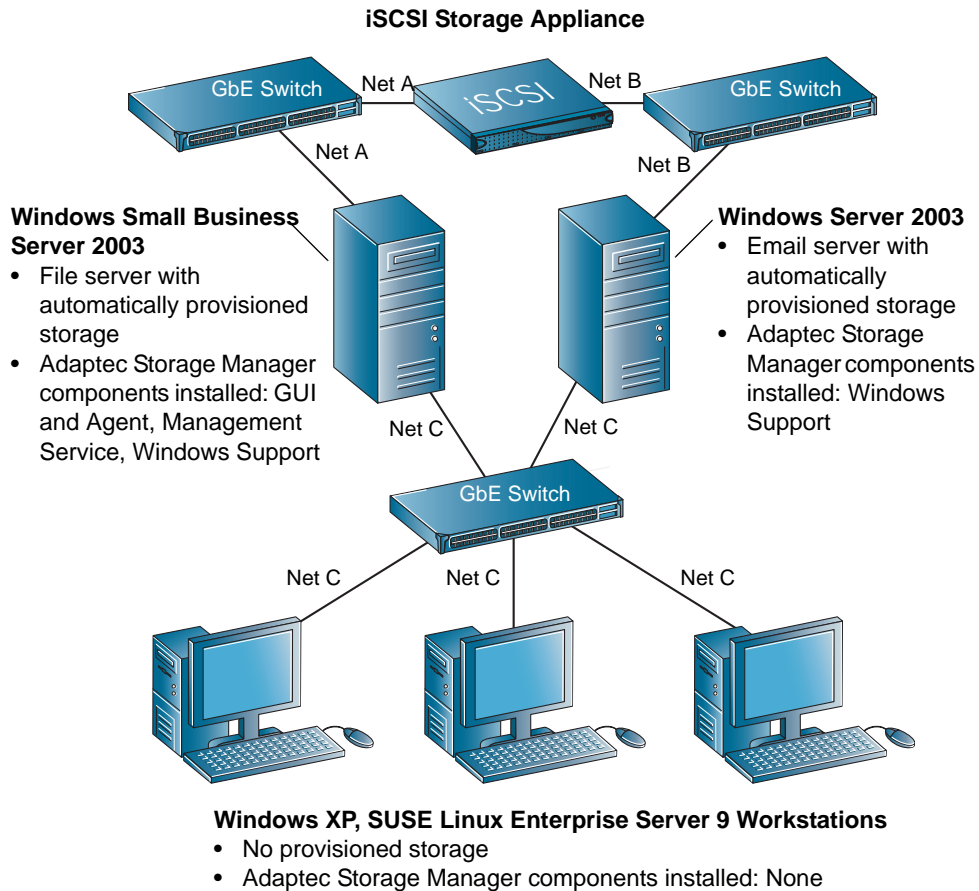
Configuration with Mirroring

Note that because there are two iSCSI Storage Appliances on this network, mirroring is supported.



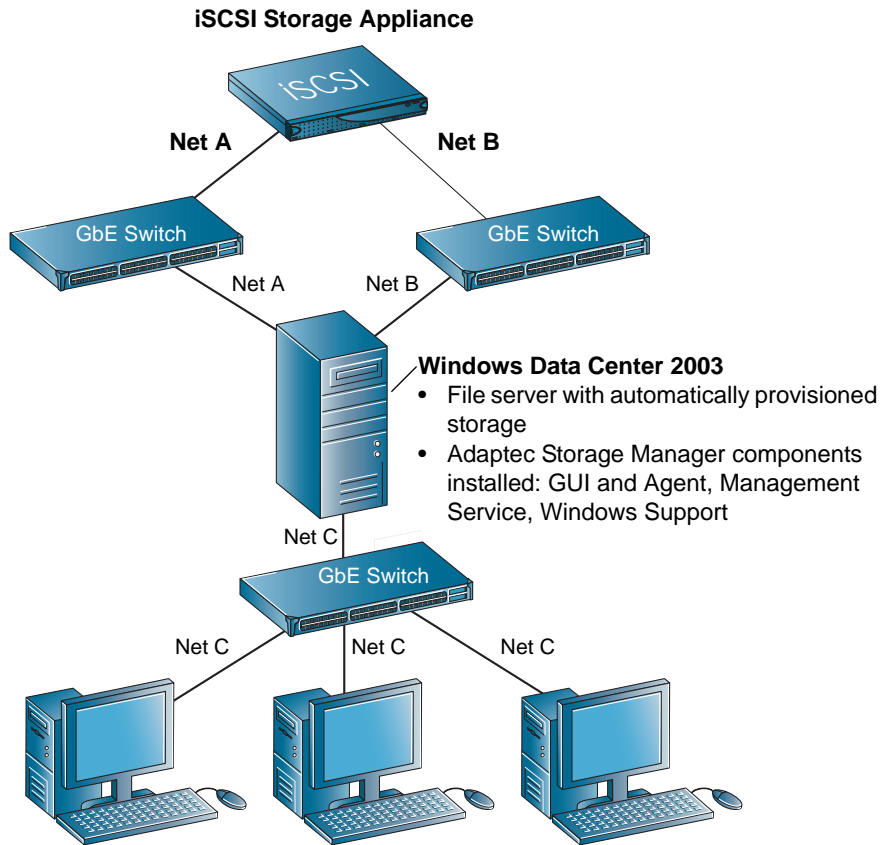
Configuration with Two Subnets

Note that because there is only one iSCSI Storage Appliance on this network, mirroring is not supported.



Configuration with Multipath Access

Note that because there is only one iSCSI Storage Appliance on this network, mirroring is not supported.



Red Hat Enterprise Linux 5, SUSE Linux Enterprise Server 9 Workstations

- No provisioned storage
- Adaptec Storage Manager components installed: None

Building an IP SAN Without a DHCP Server

If you will be adding your iSCSI Storage Appliance to a network without a DHCP server, the IP address will default to 10.10.10.10. Follow the instructions in this section to place the server on your IP subnet before using Adaptec Storage Manager to configure the server as an iSCSI Storage Appliance.

- 1 On a system in your environment (for instance, the system where you will install Adaptec Storage Manager and the Management Service), set the IP address to the same subnet as the iSCSI Storage Appliance (10.10.10.x).
- 2 To open a command prompt and ping the iSCSI Storage Appliance to ensure you have communication, enter this command:

```
ping 10.10.10.10
```

- 3 Once you have confirmed that you can communicate with the iSCSI Storage Appliance, telnet to the server by entering this command:

```
telnet 10.10.10.10
```

- 4 You will automatically be placed in the CLI Installation wizard. To exit the wizard and go to the administrator prompt, enter this command:

```
*abort
```

- 5 If prompted for an ID and password, enter:

```
admin/admin (the defaults)
```

- 6 To change the IP address, type these commands, pressing **Enter** after each line:

```
interface
```

```
manage eth0
```

```
ip xxx.xxx.xxx.xxx (the IP address you want to give your iSCSI Storage Appliance)
```

It will take a few seconds for the IP address to change, and you will lose connection to the iSCSI Storage Appliance. The LCD screen on the Snap Server 700i Series bezel will show the new IP address.

- 7 Continue with “Installing Adaptec Storage Manager” on page 27 to begin your IP SAN setup.

Note If the system you used to change the iSCSI Storage Appliance’s IP address is the one on which you’ll install Adaptec Storage Manager and the Management Service, be sure to change your Management host back to the subnet you intend to use for managing your iSCSI Storage Appliance(s).

System Requirements

- PC-compatible computer with a single Intel Pentium 1.2 GHz processor or better, or equivalent, with a supported OS and an iSCSI initiator (see the following table).

Note All OSs must have the latest Service Packs or Updates installed.

Supported OSs	iSCSI Initiators Supported by OSs
Windows Server 2003 32-bit or 64-bit: <ul style="list-style-type: none">• Enterprise Edition or Enterprise Edition R2• Standard Edition or Standard Edition R2• Web Edition Windows Small Business Server 2003 or Small Business Server 2003 R2 Windows Data Center 2003 or Data Center 2003 R2	Microsoft iSCSI Software Initiator v.2.04 or higher Q-Logic® QLA4050C Host Bus Adapter Q-Logic QLA4052C Host Bus Adapter
Windows XP (all versions), 32- or 64-bit	Microsoft iSCSI Software Initiator v.2.04 or higher
Red Hat Enterprise Linux 4 U4, 32- or 64-bit SUSE Linux Enterprise Server 9, 32- or 64-bit	Q-Logic® QLA4050C Host Bus Adapter Q-Logic QLA4052C Host Bus Adapter Bundled Cisco® iSCSI Initiator
Red Hat Enterprise Linux 5 U4, 32- or 64-bit	Bundled Open-iSCSI Initiator
VMware ESX Server 3.X.X	Bundled Software Initiator

Note An iSCSI initiator is only required on a system that will be accessing iSCSI storage. The Microsoft iSCSI Software Initiator *must* be installed on Windows 2003 systems in addition to a hardware initiator.

- At least 512 MB of RAM
- 135 MB of free drive space
- CD drive
- 256 color video mode (*optional*—required only if the GUI will be installed)

Installing Adaptec Storage Manager

This chapter explains how to install Adaptec Storage Manager.

Before You Begin

- 1 Ensure you understand the installation options described in “Introduction to Adaptec Storage Manager for iSCSI Storage” on page 13.
Adaptec Storage Manager does not need to be installed on a system unless it’s being used as an iSCSI Storage Host or as the location of the GUI and Agent and/or Management Service.
- 2 Ensure that you have installed an iSCSI initiator in each system to which you’ll be provisioning storage. Supported iSCSI initiators are listed in “iSCSI Initiator Support by OS” on page 210.
- 3 Ensure that each system meets the requirements listed on page 25.

Installing on Windows

This section describes how to install Adaptec Storage Manager on systems running Windows. Adaptec Storage Manager includes the Java Runtime Environment (JRE).

See page 25 for a list of supported OSs. Not all Adaptec Storage Manager features are supported by all Windows OSs. See “iSCSI Storage Feature Support” on page 14 for more information.

You will need the User CD to complete this task. Adaptec recommends doing the first installation on the system where you’ll run the GUI and Management Service.

Note *Advanced users only* — You can perform a silent installation, if preferred. See page 203.

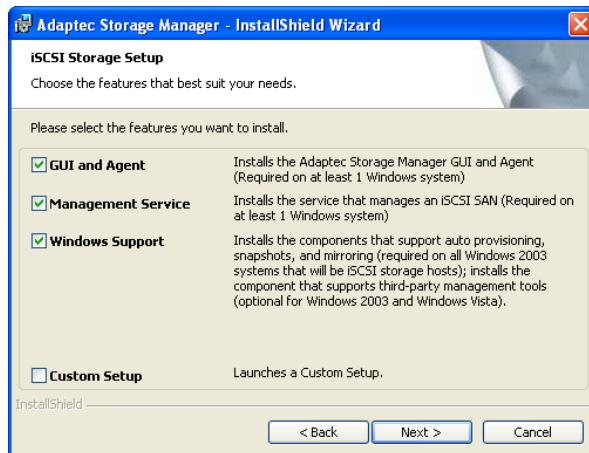
To install Adaptec Storage Manager:

- 1 If a previous version of Adaptec Storage Manager is installed on your system, uninstall it. (Refer to your operating system documentation for instructions.)

- 2 Power on the system, then insert the CD.

The Adaptec Storage Manager InstallShield wizard opens automatically. (If it doesn't, use Windows Explorer to display the CD contents, then double-click **setup.exe**.)

- 3 Click **Next** to begin the installation.
- 4 Select **I accept...**, then click **Next**.
- 5 Select **iSCSI Storage Setup**, then click **Next**.
- 6 Select the features you want to install.



Ensure that you select these minimum required features:

- **GUI and Agent**—Required on at least one system
- **Management Service**—Required on at least one system on the same subnet as your iSCSI Storage Appliance (Adaptec recommends the same system as the GUI and Agent)
- **Windows Support**—Required on any system running Windows 2003, to create an iSCSI Storage Host

Note The Windows Support option won't appear during installation on any OS besides Windows 2003.

- 7 Click **Next**.
- 8 If prompted, set a user name and password for the Management Service, then click **Next**. (You won't be prompted if you aren't installing the Management Service.)

- 9 If prompted, enter Management Service log-in information for VSS/VDS support:

Adaptec Storage Manager - InstallShield Wizard

Management Service Login
Management Service info required for external VDS and VSS support.

☐ Local Management Service

☒ Remote Management Service

Please enter the location, username, and password of a remote Management Service. This will be used to allow the VDS/VSS providers access to that specific Management Service.

Management Service Hostname

Management Service Login

Management Service Password

InstallShield

< Back Next > Cancel

- 10 Click **Install**.

- 11 When the installation is complete, click **Finish**.

Continue installing Adaptec Storage Manager, as needed. Then continue with “Setting Up Your iSCSI Storage Appliance and IP SAN” on page 33.

Installing on Linux

This section describes how to install Adaptec Storage Manager on systems running Linux. Adaptec Storage Manager includes the Java Runtime Environment (JRE).

See page 25 for a list of supported Linux OSs. Not all Adaptec Storage Manager features are supported by Linux. See “iSCSI Storage Feature Support” on page 14 for more information.

Before You Begin

You will need the User CD to complete this task.

If you are installing on systems running Red Hat Enterprise Linux, you will need to install packages from the Red Hat Linux installation CD.

Note The version strings in the file names may be different from what’s shown in the examples below. Check the version strings on your Red Hat installation CD.

- Install these two packages:

`compat-libstdc++-7.3-2.96.122.i386.rpm`

`compat-libstdc++-devel-7.3-2.96.122.i386.rpm`

For example, type:

`rpm --install /mnt/compat-libstdc++-7.3-2.96.122.i386.rpm`

where *mnt* is the mount point of the CD-ROM drive.

- (*Red Hat Enterprise Linux 4 only*), install this package:

`xorg-x11-deprecated-libs-6.8.1-23.i386.rpm`

- (*Red Hat Enterprise Linux 5 only*), install *one* of these packages:

`libXp-1.0.0-8.i386.rpm` (for a 32-bit OS)

or

`libXp-1.0.0-8.x86.rpm` (for a 64-bit OS)

If a previous version of Adaptec Storage Manager is installed on your system, you must remove it before beginning this installation. Any customization files you created with the previous version are saved and used in the upgrade.

To remove Adaptec Storage Manager GUI, enter this command:

`rpm --erase StorMan.`

To uninstall the Management Service, enter these commands:

- Stop the management service —`sh /etc/init.d/asm-mgmt stop`
- Erase the rpm —`rpm --erase asm-mgmt`

Installing Adaptec Storage Manager

Note To run Adaptec Storage Manager on Red Hat Enterprise Linux 64-bit, you must complete a standard installation with Compatibility Arch Support.

To install Adaptec Storage Manager:

- 1 Insert then mount the CD:

For Red Hat `mount /dev/cdrom /mnt/cdrom`

For SUSE `mount /dev/cdrom /media/cdrom`

- 2 Change to the cdrom directory:

For Red Hat `cd /mnt/cdrom/linux/manager`

For SUSE `cd /media/cdrom/linux/manager`

- 3 Extract the RPM package and install it:

`rpm --install ./StorMan*.rpm`

- 4 To install the Management Service:

`# rpm -i asm-mgmt-5.10-<OS-specific RPM>.rpm`

where *OS-specific RPM* is the rpm for the OS. For example: `asm-mgmt-5.10-1012.rhel5.i586`

- 5 Continue with “Creating an Administrator and Starting the Management Service”.

Creating an Administrator and Starting the Management Service

By default, Adaptec Storage Manager includes only one user account, the Administrator (which allows full access to your IP SAN and all Adaptec Storage Manager features). You use the Administrator user name and password to log into the Management Service.

To set up the Administrator account and start the Management Service, as root:

- 1 Enter this command:

`/opt/asm-mgmt/sbin/setup`

- 2 When prompted, press **Enter** to select **admin** as the Administrator user name.

- 3 When prompted, enter a password for the Administrator. When prompted, re-enter the password.

Linux shuts down and restarts the Management Service.

4 Unmount the CD:

For Red Hat `umount /mnt/cdrom`

For SUSE `umount /media/cdrom`

If you require the GUI and Agent or Management Service on more than one Linux system, repeat the steps in this section. Otherwise, continue with “Setting Up Your iSCSI Storage Appliance and IP SAN” on page 33.

Using Adaptec Storage Manager with a Firewall

If your network includes a firewall, you must unblock these ports:

- 8003 (TCP) – Allows inbound connections to the system running the Management Service; allows outgoing connections on systems running the Windows Support components((see page 17).
- 34580 (TCP) – Allows outbound connections from the system running the Management Service; allows inbound connections for systems running the Provisioning Agent (see page 17).
- 34581 (TCP) – Allows outbound connections from the system running the Management Service; allows inbound connections for systems running the Provisioning Agent (see page 17).
- 34570 to 34579 (TCP) – Supports Direct Attached Storage.
- 34570 (UDP) – Supports Direct Attached Storage.
- 34577 to 34580 (UDP) – Supports Direct Attached Storage.

If you have installed the GUI and Agent or Management Service on a system running Windows XP, you must also unblock the javaw process in the Windows firewall. Refer to your operating system documentation for instructions.

Setting Up Your iSCSI Storage Appliance and IP SAN

Once you have installed Adaptec Storage Manager, your next task is to configure your iSCSI Storage Appliance and set up your iSCSI storage. Adaptec Storage Manager provides a wizard to guide you through these steps.

An Overview of the Setup Process

Adaptec Storage Manager provides automatic prompts and a wizard to help you configure your iSCSI Storage Appliance and set up your iSCSI storage. This is an overview of the seven basic steps:

- 1 Start Adaptec Storage Manager. Adaptec Storage Manager then prompts you to log in to a Management Service and add your iSCSI Storage Appliance.
- 2 The wizard opens automatically and prompts you configure your iSCSI Storage Appliance.
- 3 Register your iSCSI Storage Appliance.
- 4 The wizard prompts you create RAID pools (*pools*). Pools can be used immediately to provision storage; you don't have to wait for them to finish building and verifying.
- 5 The wizard prompts you provision storage to your systems automatically (systems running Windows 2003 only) or manually.
- 6 Re-open the wizard to add more iSCSI Storage Appliances, create more pools, and provision more storage, as required.

Once setup in Adaptec Storage Manager is complete, two steps remain:

- 7 Log in to manually provisioned iSCSI storage.

Note Setup time depends on the amount of storage and number and types of systems in your IP SAN.

Before You Begin

- Ensure that a supported iSCSI initiator is installed on each system to which you'll be provisioning storage. (All windows 2003 systems must have the Microsoft Software Initiator installed, even if a hardware iSCSI initiator is also installed.) See "iSCSI Initiator Support by OS" on page 210 for a complete listing.
 - Ensure that Adaptec Storage Manager's Windows Support components are installed on all systems running Windows 2003 (iSCSI Storage Hosts).
 - Prepare these values for the iSCSI Storage Appliance:
 - A name for the iSCSI Storage Appliance (the *host name*); the name can be any combination of alphabetical and/or numerical characters
 - The network domain to which the iSCSI Storage Appliance belongs; the name can be any combination of alphabetical and/or numerical characters
 - A password for administrator-level (full) access to the CLI, if required
 - A password for operator-level (limited) access to the CLI, if required
- Note** The administrator- and operator-level passwords both default to admin if you don't customize them.
- IP addresses for each Ethernet Port on the iSCSI Storage Appliance
 - The netmask of the iSCSI Storage Appliance
 - The IP address to be used for broadcasts
 - Optional:
 - Default gateway address – The name or IP address of a router where packets are sent if their destinations are not defined
 - DNS server IP addresses – IP addresses of up to 3 systems that will act as DNS servers
 - If you are not on a DHCP network, ensure that IP addresses have been given to all iSCSI Storage Appliances. See "Building an IP SAN Without a DHCP Server" on page 24 for more information.

Step 1: Starting Adaptec Storage Manager

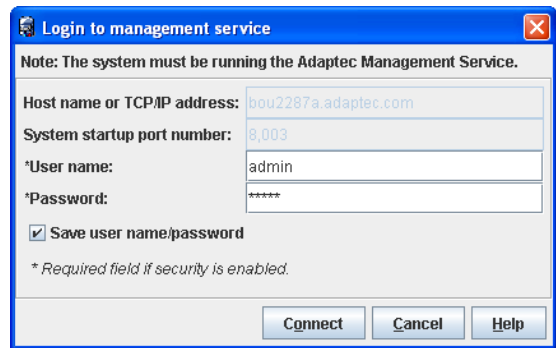
Note You need root or administrative privileges to run Adaptec Storage Manager. You can't run multiple instances of Adaptec Storage Manager on the same system.

1 Start Adaptec Storage Manager.

- On a system running Windows, click **Start > Programs > Adaptec Storage Manager**.
- On a system running Linux:
 - a Type `cd /usr/StorMan`, then press **Enter** to change to the Adaptec Storage Manager installation directory.
 - b Type `sh StorMan.sh`, then press **Enter**:

Adaptec Storage Manager opens and the Login to Management Service window pops up. If the Management Service is installed on the same system as the GUI, the host name and user name fields will be automatically filled in.

2 Enter the Administrator password you set when you installed Adaptec Storage Manager.

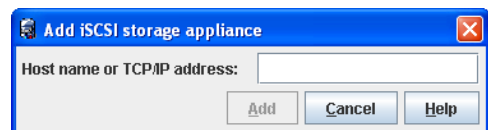


If the Management Service is not installed on the local system, enter the name or TCP/IP address of the system on which the Management Service is installed, then enter the Administrator user name and password you set when you installed Adaptec Storage Manager.

Note If you want to be prompted to log in to the Management Service each time Adaptec Storage Manager is opened, uncheck the **Save user name/password** check box. You might want to do this if some users have user-level access only to Adaptec Storage Manager. See page 48 for more information.

The wizard opens and the Add iSCSI Storage Appliance window pops up.

Note If your iSCSI Storage Appliance is on a network without a DHCP server, complete the steps in “Building an IP SAN Without a DHCP Server” on page 24 *before* you continue with this section.



- 3 Enter the host name or TCP/IP address of your iSCSI Storage Appliance, then click **Add**. The TCP/IP address appears on the front panel LCD display of your Snap Server 700i Series.

Note An iSCSI Storage Appliance can be associated with (or *added to*) only one Management Service at a time.

If prompted, click **OK**, enter the Administrator password for the iSCSI Storage Appliance, then click **Add**. (You will only be prompted for a password if this iSCSI Storage Appliance was added to another Management Service previously.) The default password is admin.

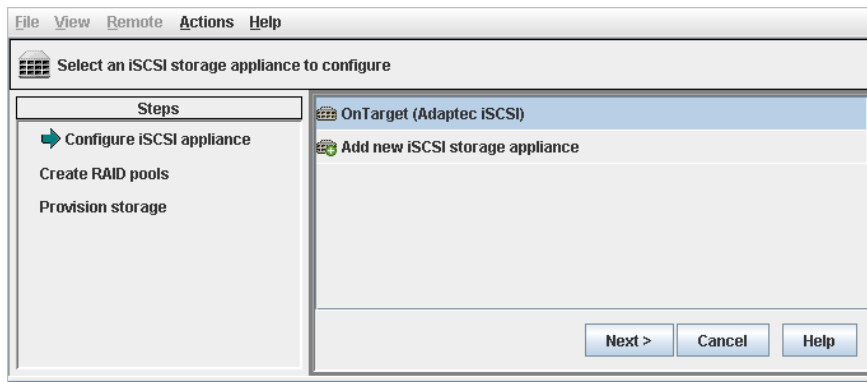
The iSCSI Storage Appliance is added to Adaptec Storage Manager.

Step 2: Configuring the iSCSI Storage Appliance

The wizard comprises three configuration steps, listed in the left panel:

- Configure iSCSI Storage Appliance
- Create RAID pools
- Provision Storage

This section explains the steps in the order in which they're presented in the wizard.



To configure your iSCSI Storage Appliance:

- 1 Select the iSCSI Storage Appliance (shown as 'OnTarget' in the previous figure), then click **Next**.

- 2 Under Network settings, enter the values you prepared in “Before You Begin” on page 34.

Enter a name for the iSCSI Storage Appliance and the network domain to which the iSCSI Storage Appliance belongs.

Enter a gateway name or IP address, or accept the default gateway.

Enter IP addresses for up to three domain name servers, if required.

- 3 (Optional) Under CLI settings, change the Administrator and Operator passwords from their defaults. (By default, both passwords are ‘admin’.)
- 4 Click **Next**, then set values for each Ethernet port on your iSCSI Storage Appliance, using the tabs at the top of the window to ensure that all ports are configured. Use static IP addresses for each port, and ensure that DHCP is *deselected*.

Click tabs to
view other
ports

Deselect
DHCP

The screenshot shows a configuration window with three tabs: "Ethernet Port 0", "Ethernet Port 1", and "Ethernet Port 2". The "Ethernet Port 0" tab is selected. Below the tabs, there is a blue checkmark icon and the text: "Set the values for each ethernet connection by selecting each tab and filling in the desired data." The configuration fields are as follows:

Field	Value
Port type	Management & iSCSI
Link speed	Auto
Maximum transmission unit (MTU)	1500
DHCP	<input type="checkbox"/>
IP address	10.20.171.193
Subnet mask	255.255.0.0
Broadcast address	10.20.255.255

At the bottom of the window, there are four buttons: "< Back", "Next >", "Cancel", and "Help".

Note By default, Ethernet Port 0 is the management port and is used by the Management Service to communicate with your iSCSI Storage Appliances; it is also an iSCSI port. You can configure Ethernet Port 0 as a management port only by selecting that option in the Port Type drop-down menu.

- 5 Click **Next**. By default, the current date and time is used for the iSCSI Storage Appliance. You can choose to manually set the date and time values, if required.

Note The Adaptec OnTarget operating system does not automatically adjust the time setting on your iSCSI Storage Appliance to accommodate Daylight Saving Time. However, the appliance uses the time setting for event timestamps only; the appliance time setting is not used for job schedules or other functions.

- 6 Click **Next**, confirm the settings for this iSCSI Storage Appliance, then click **Apply**.

The settings are applied to the iSCSI Storage Appliance.

- 7 Click **Register Now**, then follow the online instructions to register your iSCSI Storage Appliance.

The wizard continues to the Create RAID Pools step.

Step 3: Creating RAID Pools

The wizard offers two methods for creating (or *configuring*) pools—*express* configuration and *custom* configuration. This section describes how to use the custom configuration method.

The custom configuration option steps you through the manual process of creating pools, helping you group disk drives, set RAID levels, determine pool size, and configure advanced settings. Use this option when you want to create customized pools with any or all available disk drives. Up to 20 pools are supported on a single iSCSI Storage Appliance.

Note For instructions on creating pools using express configuration, see page 95.

To build pools with the custom method:

- 1 Select **Custom configuration...**, then click **Next**.
- 2 Select a RAID level.

The most common RAID levels are listed first; advanced RAID levels are available by clicking **Advanced settings**.

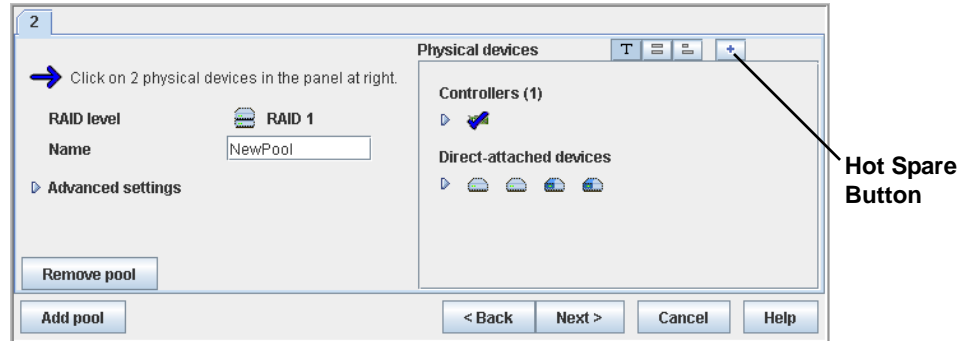
Note Although all RAID levels are listed in the wizard, the RAID levels available for your pools depend on the number of disk drives in your iSCSI Storage Appliance. See “RAID Quick Reference” on page 201 for more information.

- 3 Click **Next**.
- 4 In the Physical Devices panel, enter a name for the pool. Use a meaningful name that will help you easily identify it later. Pool names can be up to 15 characters long.

If you don’t have enough disk drives to create a pool with the RAID level you chose in the previous step, click **Back** to select a new RAID level.

- 5 Select the disk drives you want to use in the pool. (Adaptec Storage Manager prompts you to select the correct number of disk drives.)

Note Adaptec recommends that you *not* combine SAS and SATA disk drives within the same pool. Adaptec Storage Manager generates a warning if you try to create a pool using a combination of SAS and SATA disk drives.



By default, Adaptec Storage Manager automatically sets the size of the pool and maximizes the capacity of the disk drives you select.

- 6 (Optional) Create a global hot spare by control-clicking on an available disk drive; alternatively, click the **Create Global Hot Spare** button, then select an available disk drive.

A plus sign (+) appears to indicate that the selected drive will be designated as a hot spare, as shown in the previous figure. To remove a hot-spare designation from a disk drive, control-click it again.

- 7 (Optional) Click **Advanced Settings** and customize the settings as required.
- 8 If you have no other available disk drives, skip to Step 10.

If you have available disk drives and want to create additional pools, click **Add pool** to open a new tab in the wizard.

- 9 Repeat Steps 2 to 8 for each pool that you want to create.

- 10 Click **Next**, review the pool settings, click **Apply**, then click **Yes** to create the pools.

Adaptec Storage Manager creates the pool(s). You can use the pool *immediately* to provision storage, without waiting for the build/verify process to complete. For more information about pools, see "Creating and Modifying Pools" on page 94.

Caution Don't remove and reinsert any drive included in the pool while the pool is building.

The wizard continues to the Provision Storage step.

Step 4: Provisioning Storage to Your Systems

The wizard provides two paths for storage provisioning, automatic provisioning and manual provisioning. Which path you follow depends on which OS is running on the system to which you're provisioning:

- For systems running Windows 2003, see the next section.
- For systems running any other supported OS, see page 42.

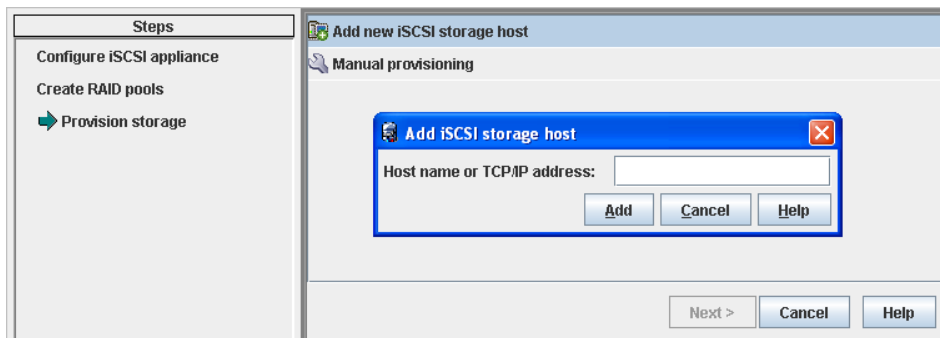
You can provision storage from a new pool *immediately*. You don't have to wait for the pool's build/verify process to complete.

Provisioning Storage Automatically

Note This task is supported by systems running Windows 2003 (iSCSI Storage Hosts) only.

When you provision storage to an iSCSI Storage Host, you create a *volume* in Adaptec Storage Manager that automatically appears as a formatted disk drive on the iSCSI Storage Host and can be used right away to store data. You don't have to manually partition or format the volume on the iSCSI Storage Host.

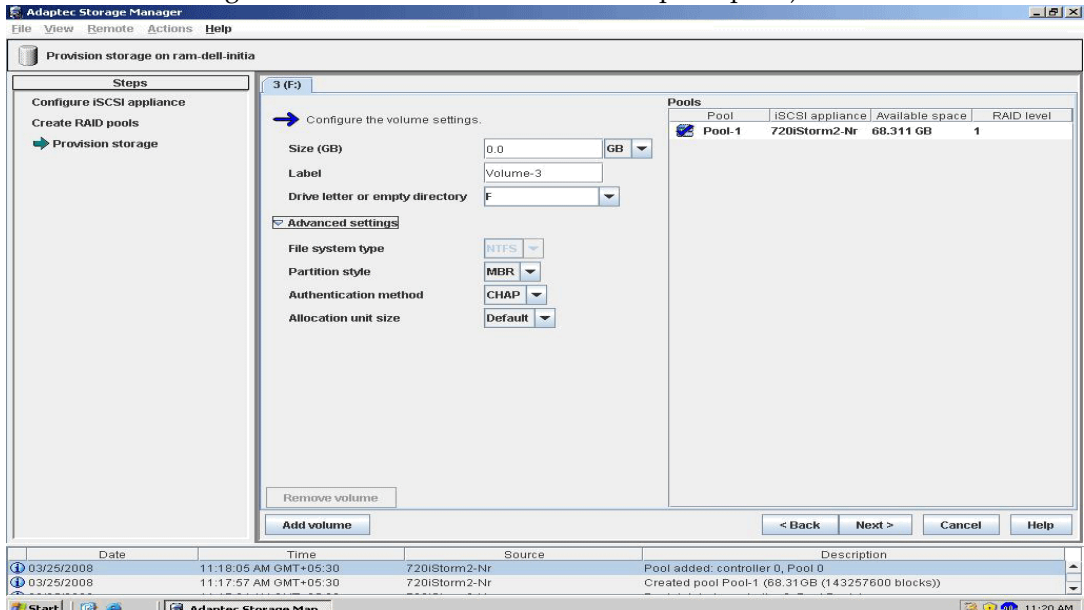
- 1 In the Add iSCSI Storage Host window of the wizard, enter the host name of a Windows 2003 system. Alternatively, if you assigned a static IP address to the system, enter it instead of the host name. Then, click **Add**.



The system appears in the Select iSCSI Storage Host list.

- 2 Select the iSCSI Storage Host you just added, then click **Next**.

- 3 Enter a size for the volume. (Adaptec Storage Manager won't allow you to enter a number greater than the amount of available pool space.)



- 4 Enter a name (or *label*) for the volume. Use a meaningful name that will help you easily identify it later.
- 5 Select a drive letter for the volume. Only unused drive letters are available in the Drive Letter of Empty Directory drop-down list.
- 6 (Optional) Click the **Advanced settings** arrow and adjust the settings as required.
Note Adaptec highly recommends using CHAP authentication. Avoid disabling authentication. (See “Controlling Access to Your IP SAN with Authentication” on page 85 for more information.)
- 7 In the Pools list, select the pool to create the volume.

The Available Space column of the Pools list shows which pools have sufficient space for the new volume. When you select a pool, the amount of available space is automatically adjusted.

If you have no more available pool space, skip to Step 9.

- 8 If you have pool space available and want to create additional volumes for this iSCSI Storage Host, click **Add volume** to open a new tab in the wizard.

Repeat this step to add volumes for this iSCSI Storage Host, as required.

- 9 Click **Next**, review the volume settings, then click **Apply**.

Adaptec Storage Manager begins to create the volume(s). The wizard closes. To use the Job Manager to monitor the volume creation, see “Monitoring Jobs in Progress” on page 115.

You can begin using the volume for storage *immediately*, without waiting for the build/verify process to complete. For more information about volumes, see “Creating and Modifying Volumes” on page 102.

To provision more storage, see “Step 5: Continuing to Build Your IP SAN” on page 46.

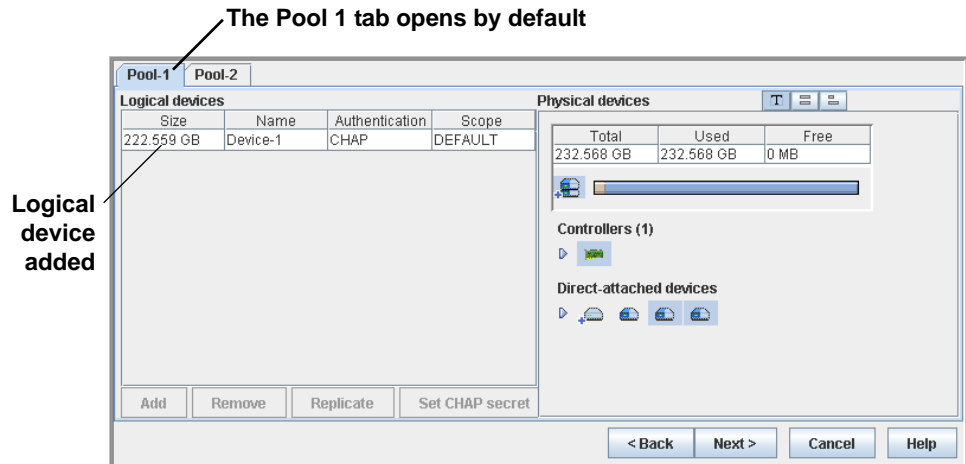
Provisioning Storage Manually

Note Use this provisioning method for systems running any supported OS other than Windows 2003.

When you provision storage manually, you create a *logical device* in Adaptec Storage Manager that becomes the *iSCSI target* accessed by an iSCSI initiator. Once a logical device is created, you must log into it from the iSCSI initiator and format it the same way you would format a physical disk drive. Once the logical device is logged into and formatted, it can be used to store data.

- 1 In the wizard, if the Add iSCSI Storage Host window has opened automatically, click **Cancel**.
- 2 Select **Manual provisioning**, then click **Next**.
- 3 Select the pool you want by clicking its tab in the upper left-hand side of the window, then click **Add**.

A logical device with default settings appears in the Logical Devices panel. By default, the logical device is the same size as the pool.



- 4 Change the logical device's default settings by continuing with Step 5, or accept the default settings and continue with Step 8.
- 5 Click inside the **Size** field and enter the size of the logical device. Specify MB, GB, or TB as the size unit (for instance, 20 GB).
- 6 Click inside the **Name** field and enter a name for the logical device. Logical device names can be up to 16 characters long.
- 7 Click inside the Authentication box and select an authentication method. (See "Controlling Access to Your IP SAN with Authentication" on page 85 for more information.) CHAP authentication is set by default.
 - To use CHAP authentication, click **Set CHAP secret**, enter a user name and password, then click **Add**. Click **Cancel** to close the window.

Note If you are using CHAP with the Microsoft iSCSI initiator, the CHAP password must be 12–16 characters long or it will be rejected by the iSCSI initiator.

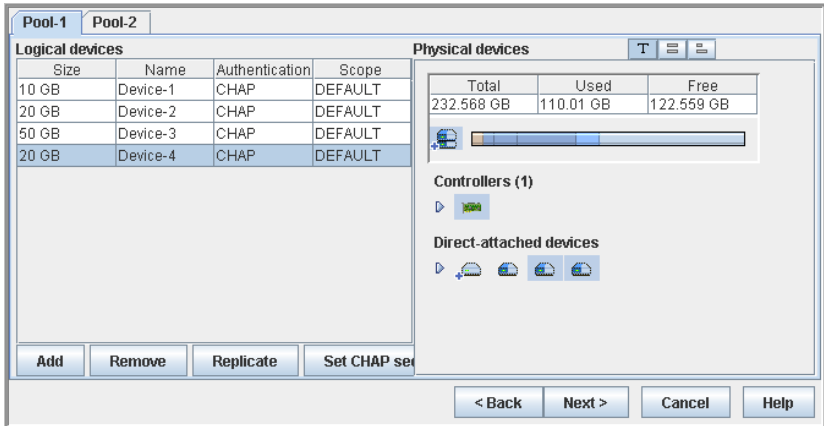
You can set different user names and passwords for each logical device you create, or you can create one user name and password and apply it to all the logical devices you create during this configuration session (existing logical devices remain unchanged). To apply the same CHAP secret user name and password to all logical devices in this session, set the same user name and password for the first logical device, then select **Apply the user name and password...** when you repeat this step for your second logical device.

- If you select SRP authentication, click inside the **Scope** field to type a unique name for the scope, or choose an existing name from the drop-down menu.

Note If you are using Internet Storage Name Service (iSNS) to discover iSCSI targets and want to control which logical devices can be logged into by which iSCSI initiators, you must use CHAP authentication. Without CHAP authentication, all iSCSI initiators will be able to log in to all logical devices.

- 8 If you have available space in this pool and want to create additional logical devices, repeat Step 3 to Step 7.

Each pool can support up to 512 logical devices. The Physical Devices panel of the window monitors the used and free space available in the pool you're working in.



The screenshot shows a configuration window for a storage pool. It has two tabs: 'Pool-1' and 'Pool-2'. The 'Logical devices' section contains a table with the following data:

Size	Name	Authentication	Scope
10 GB	Device-1	CHAP	DEFAULT
20 GB	Device-2	CHAP	DEFAULT
50 GB	Device-3	CHAP	DEFAULT
20 GB	Device-4	CHAP	DEFAULT

Below the table are buttons for 'Add', 'Remove', 'Replicate', and 'Set CHAP secret'. The 'Physical devices' section on the right shows a table with space usage:

Total	Used	Free
232.568 GB	110.01 GB	122.559 GB

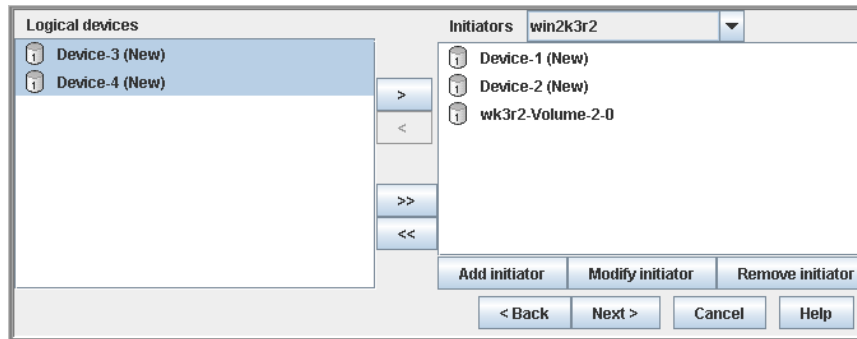
Below the table is a progress bar and a section for 'Controllers (1)' and 'Direct-attached devices'. A bracket on the right side of the window points to the 'Free' space value in the table, with the text 'Available space is tracked'.

At the bottom of the window are navigation buttons: '< Back', 'Next >', 'Cancel', and 'Help'.

To create a new logical device using the same settings as an existing one, select that logical device, then click **Replicate**.

- 9 Repeat Step 3 to Step 8 for each pool on your iSCSI Storage Appliance, as required.
- 10 Click **Next**.

- 11 Create a discovery Control List. (A discovery control list allows one or more specified iSCSI initiators to discover an iSCSI target while preventing other iSCSI initiators from discovering it. See page 83 for more information.)



- a Click **Add Initiator**.

The Add iSCSI Initiator window opens.

- b Enter the *IQN* (iSCSI Qualified Name) assigned to the iSCSI initiator.
- c Enter a name (or *alias*) for the initiator. The name must begin with a alphabetic character, and can contain only letters and numbers.
- d (Optional – VMware ESX users only) Click **Advanced options**, then enable **Uses permanent discovery session**.
- e (Optional – Advanced users only) Click **Advanced settings** to enable or disable Protocol Data Unit, iSCSI ping, and discovery settings.

Note Refer to your iSCSI initiator's documentation for more information about the advanced settings.

- f Click **OK**.

Note The iSCSI initiator appears in the Initiators drop-down menu.

- g Repeat Steps a to f to add more initiators, if required.
- h From the Initiators drop-down menu, select the initiator you want.
- i From the list of logical devices, select the logical device(s) that you want the selected initiator to discover, then click the right arrow (>).
- j Repeat Steps h and i for each iSCSI initiator.

Note Each logical device can support up to 32 iSCSI initiators. For more information about auto-discovery control lists, see page 83.

- k Click **Next**, review the configuration summary, click **Apply**, then click **Yes**.

Adaptec Storage Manager begins to build the logical device(s). The wizard closes. For more information about logical devices, see “Creating and Modifying Logical Devices” on page 104.

Before you can begin to use the iSCSI storage, you must log in to the logical devices (iSCSI targets), then partition and format them. See “Step 6: Logging in to the iSCSI Storage” on page 46 for instructions.

Step 5: Continuing to Build Your IP SAN

To add or configure another appliance, create more pools, or provision more storage, re-open the wizard by right-clicking the Management Service in the Enterprise View, then selecting **Configure SAN**.

For more information on each task, follow the instructions in this chapter or see “Modifying Your iSCSI Storage” on page 91.

Step 6: Logging in to the iSCSI Storage

If all the systems on your IP SAN are iSCSI Storage Hosts, skip to “Step 7: Registering Your iSCSI Storage Appliance” on page 47.

If you have systems on your IP SAN running Windows XP, Linux, or VMware, the next step is to log in to the logical devices from those systems, then partition and format the logical devices. Log-in varies by iSCSI initiator and OS; for complete instructions, refer to the documentation provided with your iSCSI initiator and system.

The basic steps are:

- 1 Run the iSCSI initiator’s management tool.
- 2 Point the initiator to the IP address of an iSCSI port on your iSCSI Storage Appliance (set in Step 4 on page 37).
- 3 Discover the iSCSI target that you want to access from the local system. (The iSCSI targets are the logical devices you created in “Provisioning Storage Manually” on page 42.
- 4 Log in to the iSCSI target.
- 5 Partition and format the logical device on the local system, just as you would any new locally installed disk drive.
- 6 Repeat these steps for each system on your IP SAN that is not running Windows 2003. When you are finished, continue with “Step 7: Registering Your iSCSI Storage Appliance” on page 47.

Step 7: Registering Your iSCSI Storage Appliance

If you didn't register your iSCSI Storage Appliance at the end of "Step 2: Configuring the iSCSI Storage Appliance" on page 36, you will be prompted to register again when:

- You next log in to the Management Service. Adaptec Storage Manager finds any unregistered iSCSI Storage Appliances associated with that Management Service and prompts you to register each one individually.
- You next view or change the configuration settings on that iSCSI Storage Appliance in the wizard.

You must register your iSCSI Storage Appliance to receive notification of new software releases and updates, and to receive technical support.

Beginning to Use Your IP SAN

Once setup is complete, use Adaptec Storage Manager to manage and monitor your IP SAN.

Logging In To Adaptec Storage Manager Next Time

Once your IP SAN is set up, each time you start Adaptec Storage Manager, any Management Services on the iSCSI Storage branch will be grayed out.



To begin a new session on Adaptec Storage Manager, click on the grayed out Management Service.

Unless you enable the 'Save User' feature when you log in to the Management Service (see page 35), you will be prompted to enter a user name and password. Once you have logged in and the connection to the Management Service is re-established, all iSCSI Storage Appliances and iSCSI Storage Hosts associated with that Management Service appear in the Enterprise View and you can begin to monitor and manage your IP SAN.

Allowing Other Users To Log In To Your IP SAN

By default, Adaptec Storage Manager includes only one user account, the Administrator (which allows full access to your IP SAN and all Adaptec Storage Manager features).

After setup is complete, if you want to maintain security but allow other users limited or full access to your IP SAN, you can add them to Adaptec Storage Manager, assign them an access privilege level, and set passwords for them to use when logging in to the Management Service.

Note You can log into the same Management Service from more than one GUI at the same time, even if you log in at different access privilege levels.

For more information, see “Limiting User Access to Your IP SAN with the Security Manager” on page 86.

Setting Up VSS/VDS Access

If you are using a VSS requester or a third-party VDS provisioning tool in a system running Windows XP, Linux, or VMware, you must add that system to the Microsoft VDS/VSS host list in Adaptec Storage Manager. (Refer to your Microsoft VDS/VSS documentation for more information.)

The Management Service must be installed somewhere on the same network (or subnet) as the VDS/VSS providers. The VDS/VSS providers can be installed on the same system as the Management Service, or on a separate system.

Only systems on the VDS/VSS host list can complete jobs through the Management Service, such as creating volumes or snapshots.

Note On iSCSI Storage Hosts, Adaptec Storage Manager automatically updates the VDS/VSS host list during installation. No manual intervention is required.

Adding a System to the VDS/VSS Host List

To add a system to the VDS/VSS host list:

- 1 In the Enterprise View, right-click the **Management Service**, select **Management service actions**, then click **Manage VDS/VSS access**.

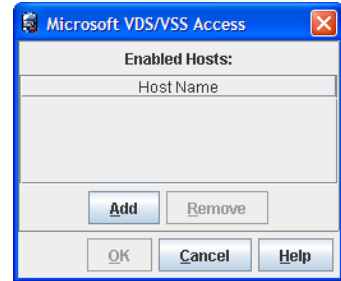
The Microsoft VDS/VSS Access window opens.

- 2 Click **Add**.

The Enable Microsoft VDS/VSS Access from this Host window opens.

- 3 Enter the host name of the system, then click **Add**.

Note To find the host name for a system, open a command prompt window, type `hostname`, then press **Enter**. Use the displayed host name in the Enable Microsoft VDS/VSS Access from this Host window. You can't use the system's IP address.



The host name appears in the host list.

- 4 Repeat Steps 2 and 3 to add more systems to the host list.
- 5 Click **OK** to close the Microsoft VDS/VSS Access window.

The systems you added to the host list can now complete jobs through the Management Service.

Note If your system has problems connecting to the VDS Provider, see page 147 for troubleshooting tips.

Removing a System from the VDS/VSS Host List

To remove a system from the VDS/VSS host list:

- 1 Open the Microsoft VDS/VSS Access window (see Step 1 on page 49).
- 2 Select the system you want to remove, then click **Remove**.

The system is removed from the host list.

- 3 Click **OK** to close the Microsoft VDS/VSS Access window.

Next Steps

Once setup is complete, use Adaptec Storage Manager to modify and monitor your IP SAN.

Adding More Components

As your iSCSI storage requirements grow, you can add more components (Management Services, iSCSI Storage Appliances, and iSCSI Storage Hosts) to your IP SAN by following the instructions in “Adding More Components to Your IP SAN” on page 91.

Protecting Your IP SAN

Adaptec recommends protecting your IP SAN using Adaptec Storage Manager’s security features. For more information, see “Protecting Your Data” on page 61 and “Controlling Access to Your IP SAN” on page 83.

Modifying, Maintaining, and Monitoring Your IP SAN

Complete instructions on modifying your iSCSI storage, maintaining your iSCSI Storage Appliance and Adaptec Storage Manager, and monitoring your iSCSI storage, network attached storage, and IP SAN are provided in the remainder of this Guide.

Getting to Know Adaptec Storage Manager

This chapter will help you familiarize yourself with the main features of Adaptec Storage Manager and learn to navigate to the information you need.

Working in Adaptec Storage Manager

Adaptec Storage Manager provides multiple ways to work with its menus and windows.

Most menu options are available by:

- Selecting items from the menu bar.
- Clicking buttons on the tool bar.
- Right-clicking on components in the main window. (Only tasks and windows associated with a specific component are available on right-click menus.)

For simplicity, the tasks in this *Guide* are explained mainly using menu bar options.

About the Actions Menu

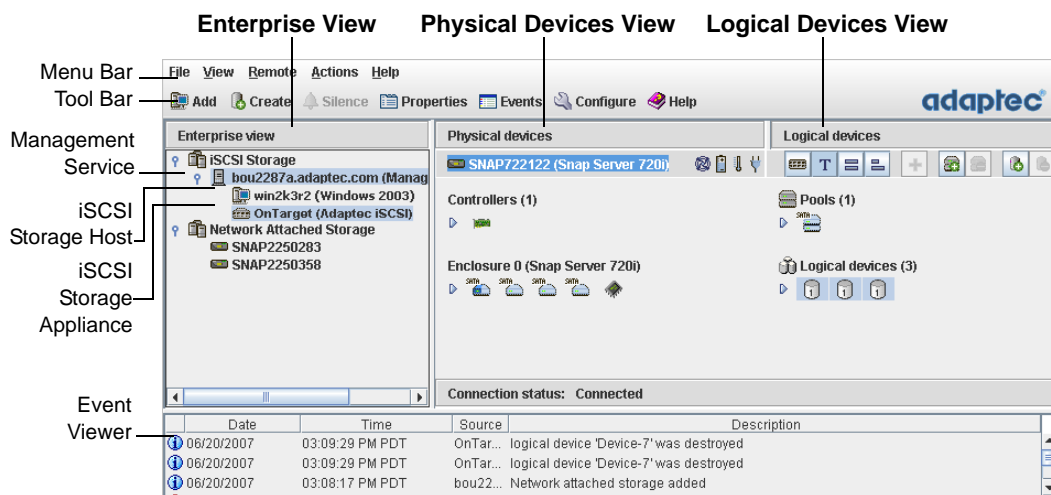
Most of the main tasks in Adaptec Storage Manager are part of the Actions menu on the menu bar (as shown at right). Options on the Actions menu vary, depending on which type of component is selected in the main window. For instance, iSCSI Storage Hosts, disk drives, and hot spares each have specialized Actions menus.



Navigating the Main Window

The main window of Adaptec Storage Manager has three main panels—left, right, and bottom—in addition to the other features shown in this figure.

The left panel always shows the Enterprise View; the bottom panel always shows the Event Viewer. Different information, or *views*, appear in the right panel depending on which component is selected in the Enterprise View. (In this example, the iSCSI Storage Appliance is selected in the Enterprise View, and the right panel displays the Physical Devices and Logical Devices Views.)



Resize the panels and scroll horizontally or vertically to view more or less information.

The Enterprise View

The Enterprise View is an expandable tree with the iSCSI Storage branch (see page 52).

The iSCSI Storage Branch

Under iSCSI Storage, the Enterprise View lists the Management Service (see page 16), the iSCSI Storage Appliance, and any iSCSI Storage Hosts that are part of your IP SAN.

Note The iSCSI Storage Appliance and the iSCSI Storage Hosts appear in the Enterprise View under the Management Service that is monitoring them.

When you select a component in the Enterprise View, the disk drives, pools, or other devices associated with it appear in the right-hand panel of the window, as shown in these figures.



When you select an iSCSI Storage Host in the Enterprise View... the storage volumes that have been provisioned to that system appear in the Volumes View.



When you select the iSCSI Storage Appliance in the Enterprise View... the controller and disk drives it contains, and the pools and logical devices created with those disk drives, appear in the Physical and Logical Devices View.

You can perform most tasks by selecting a component in the Enterprise View and working with its associated devices in the right-hand panel.

The Direct Attached Storage Branch

The Direct Attached Storage Branch lists any Adaptec DAS RAID controllers installed on the local system and any Adaptec DAS RAID controllers that you are managing remotely.

Note The Direct Attached Storage branch is not covered in this *Guide* — refer to the *Adaptec Storage Manager User's Guide for Direct Attached Storage* on the installation CD that came with your Adaptec DAS RAID controller.

The Network Attached Storage Branch

Under Network Attached Storage, the Enterprise View lists any GuardianOS-powered Snap Servers on your network.

When you select Network Attached Storage in the Enterprise View, the GuardianOS-powered Snap Servers on your network are listed in the right-hand panel of the window.

Enterprise view

iSCSI Storage

bou2287a.adaptec.com (Manag

OnTarget (Adaptec iSCSI)

Network Attached Storage

SNAP2250283

SNAP2250358

Network Attached Storage

/ Server	Status	IP Address	Model	OS Version	Disk Usage
<div><div></div> SNAP2...</div>	OK	10.20.160.23...	110	4.2.054	<div><div></div> 6% used</div>
<div><div></div> SNAP2...</div>	OK	10.20.170.77 ...	210	4.2.049	<div><div></div> 11% used</div>

When you select a GuardianOS-powered Snap Server in the Enterprise View, its properties appear in the right-hand panel of the window, using an identical format to the Properties panel used in Snap Server Manager (the management tool provided with your GuardianOS-powered Snap Server).

Enterprise view

iSCSI Storage

bou2287a.adaptec.com (Manager)

OnTarget (Adaptec iSCSI)

Network Attached Storage

SNAP2250283

SNAP2250358

Properties

Property	Value
Server Name	SNAP2250283
Server Number	2250283
Server Type	GuardianOS
Model	110
OS Version	4.2.054
BIOS Version	WAV20403

Status

Server SNAP2250283 is online.

Drive:

OK

NIC:

Eth. 1

Power Supply:

OK

Fan:

OK


System Temp:

OK

CPU Temp:

OK

Disk Usage



Total: 184.38 GB

Used: 10.84 GB (6%)

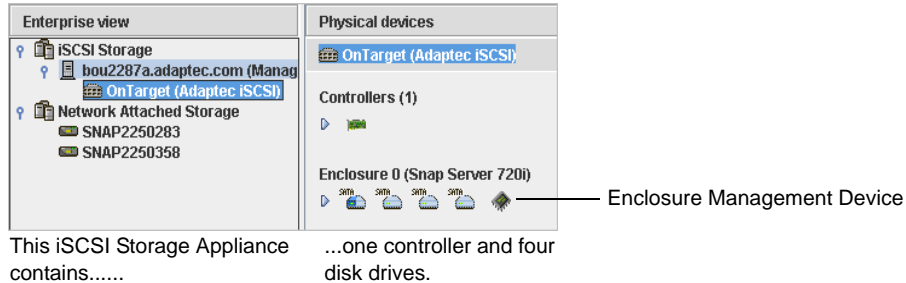
Free: 173.53 GB (94%)

Connection status: Connected

For more information about monitoring GuardianOS-powered Snap Servers in Adaptec Storage Manager, see page 132.

The Physical Devices View

When you select your iSCSI Storage Appliance in the Enterprise View, the controller and disk drives it contains appear in the Physical Devices View.



If an iSCSI Storage Appliance or enclosure contains an enclosure management device, it also appears in the Physical Devices View. Right-click the enclosure management device icon to view the status and properties of the enclosure's devices, such as its disk drives and fans.

Disk drives designated as hot spares have plus signs (+) beside them:

- A blue plus sign (shown at right) means that the spare is protecting at least one pool.
- A hot spare with a yellow plus sign (shown at right) may not be large enough to protect the pool it's assigned to, or may not be assigned to a pool.



With tool tips enabled (see page 141), hold your cursor over any disk drive to see its status, port number, and maximum speed. You can also click the arrow, shown at right, to see this same information for all the disk drives at the same time. To reveal further information, use the View buttons to change how the disk drives are displayed, as described in "Revealing More Information" on page 58.



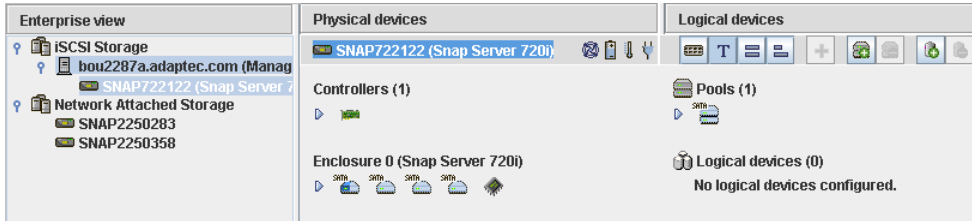
A disk drive shaded in light blue is not part of any pool. A disk drive shaded half light/half dark blue (as shown at right) has space available for additional logical devices or snapshots.



To view the pools or logical devices associated with a particular disk drive, see "The Logical Devices View" on page 56.

The Logical Devices View

When you select the iSCSI Storage Appliance in the Enterprise View, the pools and logical devices associated with that appliance appear in the Logical Devices View. (A *pool* is a collection of disk drives combined in a RAID set. A *logical device* is created within a pool and is seen as a single iSCSI target.)



This appliance is connected to...

...one controller and four disk drives...

...from which one pool has been created.

The RAID level of a logical device is indicated by the number inside the logical device's icon. For instance, the logical device shown at right has RAID 1.



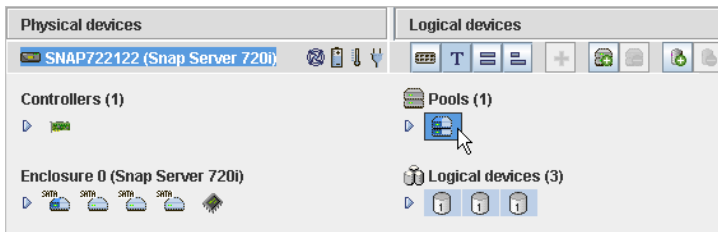
Pools protected by hot spares have plus signs (+) beside them, as shown at right.



With tool tips enabled (see page 141), hold your cursor over any pool to see its name and size; hold your cursor over any logical device to see its name, size, and status. You can also click the arrow, shown at right, to view this same information for all pools or logical devices at the same time.



Select a pool to highlight the disk drives that comprise it in the Physical Devices View, and the logical device created from it in the Logical Devices View.

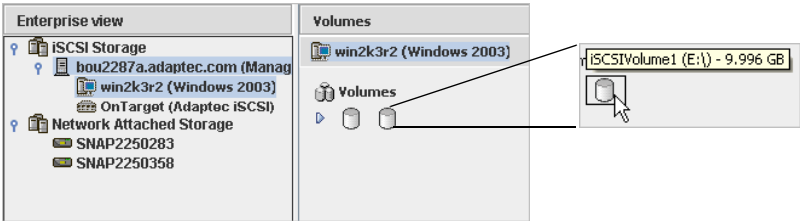


The selected pool includes four disk drives and has been used to create three logical devices.

You can also select any disk drive to see which (if any) pool it belongs to. A disk drive shaded in light blue is not part of any pool.

The Volumes View

When you select an iSCSI Storage Host in the Enterprise View, the storage volumes that have been provisioned to that system appear in the Volumes View.



This iSCSI Storage Host has... ..two storage volumes provisioned to it.

With tool tips enabled (see page 141), hold your cursor over any volume to see its size and drive letter (as shown in the previous figure). You can also click the arrow, shown at right, to see this same information for all volumes at the same time. To reveal further information, use the View buttons to change how the volumes are displayed, as described on page 58.

The Snapshots View

When you select a snapshot in the Enterprise View, the snapshots associated with the volumes on your iSCSI Storage Hosts appear in the Snapshots View.

If you have created *third-party snapshots* (snapshots created using a tool other than Adaptec Storage Manager), they also appear in the Snapshots View.



The volumes associated with the iSCSI Storage Host... ..have four Adaptec Storage Manager snapshots... ..and one third-party snapshot associated with them.

Adaptec Storage Manager snapshots are organized by *snapshot sets* — one or more snapshots created at the same time. With tool tips enabled (see page 141), hold your cursor over any snapshot to see its name, volume ID, and mount point (if any). You can also click the arrow, shown at right, to view this same information for all snapshots at the same time.

Third-party snapshots display their basic properties only.

Revealing More Information

You can reveal more information about volumes, disk drives, pools, and logical devices by using the View buttons (circled below) to change what information displays.

Note Not all views are available for all components.

Physical devices

OnTarget (Adaptec iSCSI)

Controllers (1)

Enclosure 0 (Snap Server 720i)

Logical devices

Pools (1)

Logical devices (5)

Default View
(Enclosure View)

Click the arrows to expand list and reveal basic information.

Physical devices

OnTarget (Adaptec iSCSI)


Controllers (1)

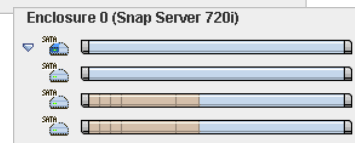
Enclosure 0 (Snap Server 720i)


Logical devices

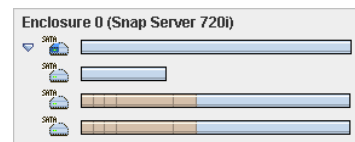
Pools (1)

Logical devices (2)

 Click this button to see the size capacities of your disk drives. Disk drives or segments of disk drives that are included in logical devices are shaded brown.



 Click this button to see the size capacities of your disk drives relative to each other. (Also available in the Volumes View.)

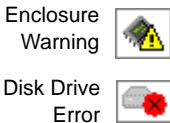


Checking System Status from the Main Window

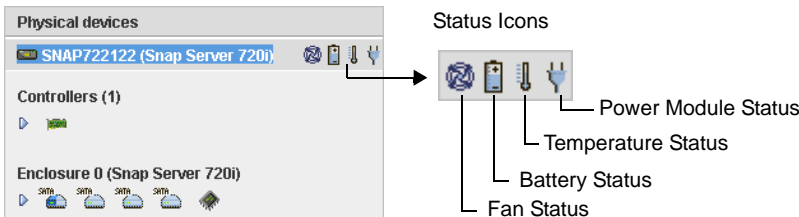
Adaptec Storage Manager includes an Event Viewer for at-a-glance system and event status information. The Event Viewer provides status information and messages about activity (or *events*) occurring on your IP SAN. Double-click any event to see more information in an easier-to-read format.

	Date	Time	Source	Description
ⓘ	06/22/2007	03:18:00 PM PDT	OnTarget	Created pool Pool-2 (73.37GB (153866240 blocks))
ⓘ	06/22/2007	03:17:23 PM PDT	OnTarget	logical device 'wk3r2-Volume-2-0' was destroyed
ⓘ	06/22/2007	03:17:16 PM PDT	OnTarget	logical device 'Device-4' was destroyed
ⓘ	06/22/2007	12:36:33 PM PDT	bou2287a.adaptec.com	Established a connection to bou2287a.adaptec.com (Mana...
ⓘ	06/22/2007	12:36:32 PM PDT	bou2287a.adaptec.com	Network attached storage added

Warning- and Error-level icons, shown at right, appear next to components (such as systems and pools) affected by a failure or error, creating a trail, or *rapid fault isolation*, that helps you identify the source of a problem when it occurs. See “Identifying Failed or Failing Components” on page 148 for more information.



If your IP SAN includes a controller with a temperature sensor, or an enclosure with an enclosure management device, such as a SCSI Accessed Fault-Tolerant Enclosure (SAF-TE) processor, temperature, fan, and power module status is displayed by status icons in the Physical Device view, as shown in the next figure. These status icons change color to indicate status (see “What Do the Status Icons Mean?” on page 119).



For more information, see “Monitoring Status and Activity” on page 115.

Getting Help

Adaptec Storage Manager online Help includes conceptual information, glossary definitions, and descriptions of on-screen menus and items, in addition to step-by-step instructions for completing tasks.

To open the online Help, click the **Help** button, or press the **F1** key for context-sensitive help.

Press the **Help** button in a dialog box or wizard for help with that specific dialog box, window, or procedure.

For more information about the GuardianOS, and for instructions on using the Administration Tool, refer to the *Snap Server Administrator Guide* on the User CD or the Administration Tool online Help.

Uninstalling Adaptec Storage Manager

Uninstalling From Windows Systems

To uninstall Adaptec Storage Manager from a Windows system, use the Add or Remove Programs tool in the Control Panel. All Adaptec Storage Manager components, including the Management Service, will be uninstalled.

Uninstalling From Linux Systems

- 1 To uninstall Adaptec Storage Manager from a Linux system, type this command:
`rpm --erase StorMan`
- 2 To uninstall the Adaptec Storage Manager Management Service, enter these commands:
 - Stop the management service.`sh /etc/init.d/asm-mgmt stop`
 - Erase the rpm.`rpm --erase asm-mgmt`
- 3 When prompted to stop the Management Service, type OK, then press **Enter**.
Adaptec Storage Manager and the Management Service are uninstalled.

Protecting Your Data

In addition to the redundancy protection provided to your storage pools by RAID, you can protect your data by assigning hot spares (disk drives that automatically replace failed disk drives) to your storage pools, taking application-consistent snapshots of it (“pictures” of your data at a particular point in time) for backup purposes, and mirroring your data (creating an exact copy that is continuously synchronized with the original).

This chapter explains how to use Adaptec Storage Manager to work with hot spares, snapshots, and mirrored volumes.

Protecting Your Data with Hot Spares

A *hot spare* is a disk drive that automatically replaces any failed drive in a pool, and can subsequently be used to rebuild that pool. (For more information, see “Recovering from a Disk Drive Failure” on page 150.)

Hot spares assigned to iSCSI Storage pools are *global* hot spares—they protect any pool in the iSCSI Storage Appliance (except RAID 0 logical devices). You can create a hot spare either before or after you build your pools; you can also create a hot spare while you’re creating a pool. To create a hot spare, see page 62.

An *assigned* hot spare are *dedicated* hot spares—they are used only to rebuild the logical devices to which they are assigned.

Hot Spare Limitations

- You can’t create a hot spare for RAID 0 pools.
- You can’t create a hot spare from a disk drive that is already part of a pool.
- You should select a disk drive that is at least as big as the largest disk drive it might replace.
- Adaptec recommends that you *not* designate a SAS hot spare for a pool comprising SATA disk drives, or a SATA hot spare for a pool comprising SAS disk drives.

Creating a Global Hot Spare for a Pool

This section describes how to designate a hot spare before or after you create a pool.

Note To designate a hot spare while you're creating a pool, see Step 6 on page 39.

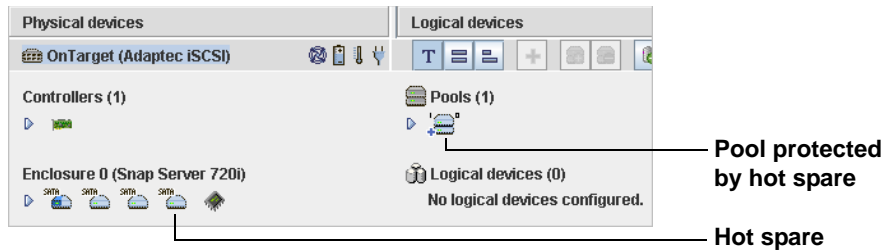
To designate a hot spare:

- 1 In the Enterprise View, select the iSCSI Storage Appliance.

In the Physical Devices View, click the disk drive you want to designate as a hot spare. (See "Hot Spare Limitations" on page 61 for help selecting a disk drive.)

- 2 Click the **Create Global Hot Spare** button (shown at right).

A plus sign appears on the selected disk drive, indicating that it's designated as a hot spare. A plus sign also appears on the pool that includes the hot spare. (A yellow plus sign indicates an error. See "What Do the Hot Spare Icons Mean?" on page 63 for help solving the problem.)



Any other pools created on that iSCSI Storage Appliance are protected automatically by that hot spare.

Assigning a Hot Spare to a Logical Device




Note You cannot assign a hot spare while a logical device is being built or modified.

To assign a hot spare drive to a logical device:

- 1 In the Physical Devices View, select an available (unused) disk drive.
- 2 In the **Actions** menu, click **Create assigned hot-spare drive**, then select the logical device you want.

Note A plus sign appears on the selected disk drive, indicating that it's designated as a hot spare. (A yellow plus sign indicates an error. See "What Do the Hot Spare Icons Mean?" on page 63 for help solving the problem.)

What Do the Hot Spare Icons Mean?

Icon	Explanation	Action
	Healthy global or dedicated hot spare	No action required.
	Hot spare is too small to protect the pool(s) it's assigned to	Designate larger disk drive as hot spare
	Hot spare has been built into a pool after disk drive failure	Designate replacement or other available disk drive as new hot spare

Deleting a Hot Spare

You can delete a hot spare. You may want to do this to:

- Make disk drive space available for a pool or logical device.
- Remove the 'hot spare' designation from a disk drive that is no longer being used as a hot spare.

To remove or delete a hot spare:

- 1 In the Enterprise View, select the iSCSI Storage Appliance associated with the hot spare.
- 2 In the Physical Devices View, click the hot spare.
- 3 In the **Actions** menu bar, click **Delete hot-spare drive**.

The hot spare is deleted and the disk drive becomes available for other uses in your IP SAN.

Backing Up Your Data with Snapshots

Note To create snapshots on systems running Windows XP, Linux, or VMware, you must use the CLI (see page 179.) Snapshots created on these OSs are fail-consistent only, as the VSS Provider is not supported by the OSs. We can now use Target Based Snapshots in Windows XP and Linux operating systems.

Adaptec Storage Manager's *snapshot* feature creates a frozen copy of a volume at a point in time. A snapshot sets up a link between the source volume and the underlying logical devices in your iSCSI Storage Appliance. When data on the source volume changes, the differences are captured on the snapshot drive.

If an error occurs on the volume, you can roll back the volume to the point in time when the snapshot was created. You can also use the snapshot feature for tape backup, drive cloning, and multi-server rollout.

Adaptec Storage Manager has a snapshot wizard to help you create a snapshot and *snapshot sets* (a group of snapshots taken at the same time). A snapshot can include one volume or multiple volumes. You cannot create a snapshot of either a mirrored volume (the mirror manager) nor its mirror (the mirror plex). You can't work with any individual snapshot in a snapshot set; only the complete snapshot set can be mounted or deleted, for example.

You can choose to run a snapshot job immediately, or schedule it for another time.


Before You Begin

Ensure that the VSS Provider (see page 17) is installed on the system on which you plan to take snapshots. Also ensure that Microsoft Hotfix 913648 or equivalent is installed on the system. Refer to <http://support.microsoft.com/kb/895092>.

Creating a Snapshot from an iSCSI Storage Host Volume

You can create a up to 256 separate snapshots on one iSCSI Storage Appliance. (You can include multiple volumes in one snapshot). When you are creating snapshots for a mirrored volume, snapshots will be created on the mirror master plex only.

To create a snapshot:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, select any volume.
- 3 Click the Snapshots button (shown at right). Or, In the **Actions** menu, select **Create snapshot**. 

The wizard opens.

- 4 Select the volume(s) you want to include in the snapshot set.

Note If the volume you select has dependent volumes listed, Adaptec strongly recommends that you copy the volume *and* its dependencies, to avoid losing related data.

- 5 Type a name or description for the snapshot, then click **Next**.

The Snapshot Settings screen opens. The pool for the snapshot is automatically assigned.

- 6 Set the mount point for the snapshot. (If you don't want to mount the snapshot, select **None** from the iSCSI Storage Host drop-down list, then skip to Step 7.)
 - a Select the iSCSI Storage Host where you want to mount the snapshot, then assign a drive letter.

All volumes in a snapshot set are mounted or unmounted. If you mount the snapshot set, all volumes are mounted on the same server.

- b Set the access type (**Read only** or **Read/Write**).
 - c If you are copying multiple volumes, click the tab of the next volume, then repeat Steps 4 to 6.
- 7 Click **Apply** to begin the snapshot immediately. The Job Manager opens (see page 115) and the job begins.

To schedule the snapshot for a later time or to create the snapshot on a recurring basis, see “Scheduling a Snapshot Job” on page 70.

When the snapshot has been created, it appears in the Enterprise View. Select any snapshot in the Enterprise View to open the Snapshot View, shown in the next figure.



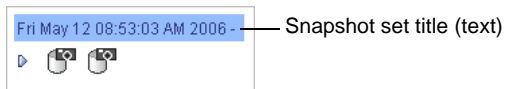
Caution Carefully monitor the capacity of the pool that contains your snapshots. At this time, when the pool reaches maximum capacity, all snapshots contained within it will go offline. See “Recovering Snapshots After a Pool Capacity Failure” on page 154 for more information.


Mounting a Snapshot Set

When you create a snapshot set, you have the option to mount it to a specific system on your IP SAN. (The individual snapshots within a snapshot set are either all mounted or all unmounted. You can't mount just some individual snapshots.) If you choose *not* to mount a snapshot set during creation, you can mount it after it has been created.

To mount a snapshot set:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Snapshots View, select the title of the snapshot set.



- 3 Click the **Mount Snapshots** button (shown at right). Or, In the **Actions** menu, select **Mount snapshot set**. 

The Mount Snapshot Set window opens.

- 4 Select the iSCSI Storage Host on which to mount the snapshots.
- 5 Set a mount point for the snapshots of each volume by selecting a drive letter or entering the full path to an empty directory.

Each snapshot must have its own mount point.

- 6 Set the access type (**Read only** or **Read/Write**).

All snapshots in the snapshot set will have the same access type.


- 7 Click **OK** to mount the snapshot set.

Caution If you set up a recurring job that creates and mounts a snapshot on the same disk drive, you must free the disk drive after each job or the job will fail.

Deleting a Snapshot Set

Although you can't delete an individual snapshot, you can delete an entire snapshot set.

To delete a snapshot set:

- 1 In the Snapshots View, select the title of the snapshot set.
- 2 Click the **Delete Snapshots** button (shown at right). Or, In the **Actions** menu, select **Delete snapshot set**. 
- 3 Click **Yes** to delete the snapshot set.

Creating Target Based Snapshots

ASM provides application consistent snapshots for Windows volumes (VSS). For other operating systems you must use the command line utility to perform snapshot operations. You can also snapshot logical devices using ASM, for non-Windows operating systems. To perform a snapshot, launch ASM, right-click a logical device and select the snapshot option. ASM will allow the user to create the snapshot immediately or schedule the snapshot to occur at a later time.

To create a target based snapshot:

Note Ensure to disconnect all the initiators before creating a target based snapshot.

- 1 Create a logical device using manual provisioning from ASM.
- 2 Set the authentication type to either **CHAP** or **None** and assign to any initiator.
- 3 Login to the new logical device and store data in it.
- 4 Log off the initiator.

Note Always log off the parent before creating a target based snapshot, as target based snapshots are not application consistent snapshots.

- 5 Select the target in the Enterprise View and right-click the logical device and select **Create Snapshot**.
- 6 Provide a description to the target based snapshot.
- 7 Select the **Access Type**.
 - Read Only
 - Read Write
- 8 Select the **Authentication Type**.
 - CHAP
 - None

Note By default the authentication type is set to be same as the parent.

- 9 Assign to the initiator.

Note Assign to the provisioned system if you want to mount the TBS using mount option.

- 10 When the target based snapshots are created the snapshots will be listed under ASM snapshots in the Enterprise View.

Note If you create CLI snapshots, they will be listed under third party snapshots.

Mounting a Target Based Snapshot

You can mount a TBS onto any provisioned system. Complete these steps to mount a target based snapshot onto a provisioned system.

Note Refresh the ASM once before trying to mount the TBS, to ensure that it selects the latest available drive letter.

- 1 Select the Snapshot from the Enterprise View, right-click the snapshot and choose an option to mount.

Note Only snapshots with correct file system can be mounted.

- 2 Select the drive letter and CHAP information.
- 3 Go to My Computer and check if the TBS is successfully mounted and has all the data of the parent volume.

Performing Roll back of a Mirror Snapshot

You cannot perform a snapshot rollback of a mirrored volume. To rollback the user will need to perform the following steps:

- 1 Break the mirrored volume into basic non-mirrored volumes.
- 2 Logout any initiator connections to the volume.
- 3 Issue rollback from the CLI and wait for rollback to complete.
- 4 Once rollback is complete, login to the volume.
- 5 Recreate the mirror with full resynchronization.

If a full resynchronization is required during a mirror failover, existing snapshots on the slave plex that is being resynchronized will be deleted.

Performing Roll back of a Target Based Snapshot

Rollback operation copies the data from the snapshot volume to the original volume. So if changes were made to the original volume, all such changes will be lost and data at the time of snapshot taken will be replicated to the original volume.

- 1 After taking the snapshot, login to the original volume and modify the data,. Log out both parent and snapshot volume from all initiators.
- 2 Select the Snapshot from the enterprise view and right-click on target based snapshot and select **Roll back Snapshot set**.
- 3 To verify if the progress of the roll back, select the target in the Enterprise view and check the roll back status.
- 4 Once the rollback is complete, login to the parent volume and verify if the rollback is completed successfully.

Creating Volume Snapshots

Volume snapshots are snapshots of a file or directory on a specific volume, taken at any time.

Note Volume snapshots are supported only in Windows 2003.

To create volume snapshots,

- 1 Create a pool.
- 2 Create a logical drive using the provisioning agent.

Note The pool should have capacity to hold all the snapshots you present in a particular logical device.

- 3 Add file(s) to your logical device.
- 4 In ASM, click the provisioning agent in the Enterprise view. All the associated volumes are display in the Physical and Logical Device view.
- 5 Right click the volume you want to snapshot and click **Create Snapshot**.

Note The maximum number of volumes you can include in a snapshot set is 4 from a single iSCSI storage appliance, and is 9 if you are using 3 iSCSI storage appliances.

- 6 Select the volume you want to snapshot. Enter a description and click **Next**.
- 7 Select the **Managed system, Drive** and **Access Type** and click **Next**.
- 8 Click **Apply** to create the snapshot or **Schedule** to snapshot the volume at a specific time.

Ensuring Pool Capacity for Your Snapshots

Ensuring that there is adequate capacity in a pool to maintain your snapshots is extremely important. Currently, when a pool reaches maximum capacity, all snapshots contained within it go offline and are only retrievable manually.

Always carefully monitor the capacity of any pool that contains snapshots to avoid the lengthy retrieval process and prevent snapshot loss.

Recovering from a Pool Capacity Warning

Adaptec Storage Manager generates a warning message when pool capacity reaches 5%. A second warning message is generated when pool capacity reaches 3%.

When you receive one of these messages, delete any unneeded volumes from the pool or expand the size of the pool *as soon as possible*.

Recovering from a Pool Capacity Failure

If pool capacity becomes exhausted, all snapshots within that pool (and all the volumes on which the snapshots are based) go offline, and Adaptec Storage Manager generates a failure message.

To recover, see “Recovering Snapshots After a Pool Capacity Failure” on page 154.

Scheduling a Snapshot Job

If a job is lengthy and limits access to your iSCSI Storage Appliance, you may want to set a date and time for the job to complete, instead of running the job while there is activity on your IP SAN. If a job must be performed regularly, you can schedule it to recur at preset times.

At this time, on the iSCSI Storage branch of Adaptec Storage Manager, you can schedule snapshot jobs.

To schedule a job:

- 1 Complete each step of the task until you are prompted to click **Apply**. (*Don't click Apply.*)

- 2 Click **Schedule**.

The schedule window opens.

- 3 Set the date and time for the job.

Note Keep geography in mind – If you are scheduling jobs on an iSCSI Storage Appliance located in another geographical area, remember that the time you set for a scheduled job is the *Management Service's* time, which may be different from local time or the iSCSI Storage Appliance's time. You will be prompted to select a new time if the one you've set occurs in the past on the Management Service.

- 4 If you want this job to occur regularly, set the frequency, and set the number of snapshots to retain at one time.

Note When the maximum number of snapshots is reached, the oldest snapshot will be replaced by a new one.

- 5 Click **Apply**.

The job is saved in the Schedule Manager. To check the status of a scheduled job, see the next section.

Caution If you set up a recurring job that creates and mounts a snapshot on the same disk drive, you must free the disk drive after each job or the job will fail.

Checking on Scheduled Jobs

You can use Adaptec Storage Manager's Schedule Manager to monitor and modify the jobs you have scheduled. (To schedule a job, see page 70.)

Jobs are associated with Management Services. If you have multiple Management Services on your IP SAN, the Schedule Manager displays the scheduled jobs associated with each Management Service separately.

To check on scheduled jobs:

- 1 In the Enterprise View, select the Management Service.
- 2 In the **Configure** menu, select the Management Service you want, then select **Schedules**.

The Schedule Manager opens on the Schedules tab of a new window. The Execution Result column shows the current condition of each job:

- **Success** – The job has been completed successfully.
- **Success*** – A recurring job has been completed once and will be repeated at the scheduled time.
- **Warning** – The job has not been completed successfully. A recoverable error has occurred, such as a job missing its start time.
- **Failure** – The job has not completed successfully. A non-recoverable error has occurred.

The Schedule Manager displays all scheduled jobs in order of scheduled start time, and includes basic information about each job. Although you can't sort the jobs in any other order, you can reorganize the columns in the Schedule Manager by clicking and dragging the column heads.

Note For more information about a Warning or Failure message, double-click the job to open the Job Properties window.) You can undo a failed job – see page 117.

- 3 Close the Schedules window when you're done.

Modifying a Scheduled Job

If your requirements change, you can reschedule a job to a different date or time, or change the frequency with which it recurs. For recurring snapshot jobs, you can also change the number of snapshots to retain at one time.

To modify a scheduled job:

- 1 Open the Schedule Manager (see page 71).
- 2 Select the job you want to change, then click **Modify Scheduled Job**.
- 3 In the Modify Scheduled Job window, make the required changes, then click **OK**.

The job and Schedule Manager are updated with the new information.

What if a job misses its start time?

If a job misses its start time, it must be rescheduled. For instructions, see “Modifying a Scheduled Job” on page 71.

If a recurring job misses its start time, it is automatically rescheduled to run at the next scheduled interval.

Deleting a Scheduled Job

If a scheduled job is no longer required, you can delete it from the Job Manager.

To delete a job:

- 1 Open the Schedule Manager (see page 71).
- 2 Select the job you want to delete, then click **Delete scheduled job**.
- 3 Click **Yes** to confirm the deletion.

The job is deleted.

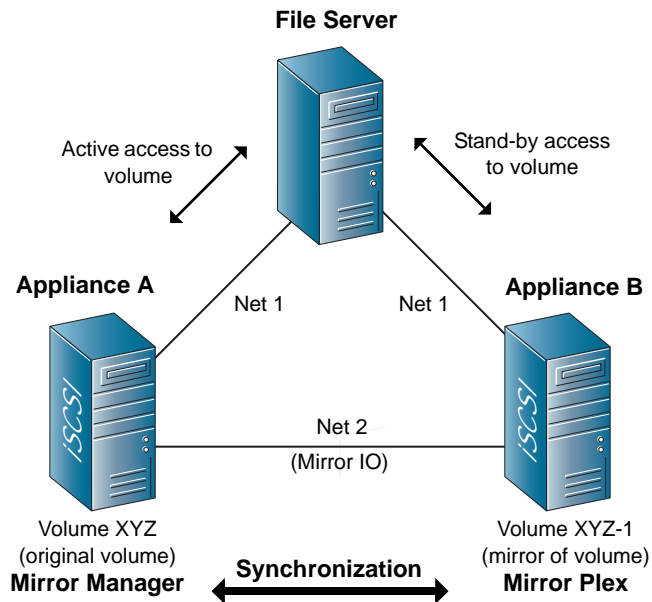
Backing Up Your Data with Mirrored Volumes

You can mirror a volume to add another layer of data protection and increase data availability.

Note Mirroring is supported on iSCSI Storage Hosts only.

When a volume is *mirrored*, a second volume residing on a second iSCSI Storage Appliance becomes a duplicate of the original volume, and the data between the volume and its mirror is continually synchronized. If a data-access problem occurs on the original volume, *failover* (from the original volume to the mirror) occurs automatically.

A dedicated link between the volume and its mirror is required, to support the continual synchronization.



Mirror Managers and Mirror Plexes

The original volume is called the mirror *manager*; its mirror is called the mirror *plex*. The mirror plex must have a name that's unique across both iSCSI Storage Appliances. Data is written to the mirror manager first; then, the mirror plex is synchronized with the mirror manager.

If required, you can change the priority of the mirror plex so that it becomes the mirror manager, and vice versa. See "Changing Mirror Priorities" on page 75 for instructions.

Once a mirrored volume is created, you can use Adaptec Storage Manager to manage it. This section describes how to:

- Create a mirrored volume (see page 74).
- Extend a mirrored volume (see page 75).
- Change mirror priorities (see page 75).
- Force a failover on a mirrored volume (see page 76).
- Fail back a mirrored volume (see page 76).
- Break a mirrored volume (see page 77).
- Delete a mirrored volume (see page 78).

Creating a Mirrored Volume

You can mirror a new volume or an existing volume.

Note The MPIO DSM driver (see page 17) must be installed on the iSCSI Storage Host that's accessing the volume. Without the MPIO driver, automatic failover can't occur.

To create a mirrored volume:

- 1 In the Volumes View, right-click the volume you want to mirror, then select **Create remote mirror plex**.

The Define Remote Mirror Plex window opens.

- 2 In the Pools list, select the pool in which you want to create the mirror.

Only pools with sufficient space that also reside in a different iSCSI Storage Appliance than the original volume appear in the Pools list.

- 3 (Optional) Click **Advanced settings** to adjust the capacity display units.
- 4 Click **Next**, review the mirror settings, then click **Apply**.

The Job Manager opens (see page 115) and the job begins.

When the job is complete, the volume and its mirror can be used.

Note If Adaptec Storage Manager displays a message that indicates there is insufficient space to create a mirror plex, press **F5** then try creating the mirror plex again.

Extending a Mirrored Volume

You can increase the size of a volume, up to the space available in its pool. If you want to increase the size of a mirrored volume, the mirror also has to have enough space in its pool to be extended by the same amount.

To extend a mirrored volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.

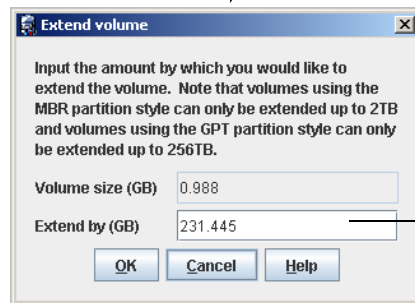
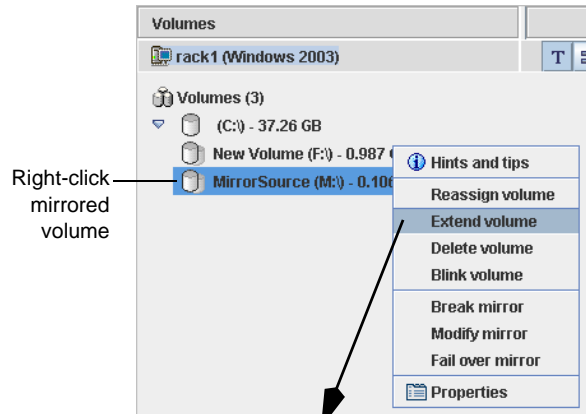
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Extend volume**.

The Extend Volume window opens.

- 3 By default, the Extend By field is set to the space available in the pool. Adjust the number to suit your requirements, then click **OK**.

The Job Manager opens (see page 115) and the job begins.

When the job is complete, the volume appears in the Volumes view with its new size.



The default extension equals the maximum available space

Changing Mirror Priorities

This section describes how to change the priority of a mirrored volume. When you change the priority, the mirror (or *mirror plex*) becomes the volume (or *mirror manager*) and the original volume becomes the mirror.

To change mirror priorities:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Modify mirror**.

The Modify Mirror window opens.

- 3 In the Plex Properties panel, select the existing mirror manager.

- 4 Click the down arrow button to lower that logical device's priority from mirror manager to mirror plex.

The two logical devices exchange priorities—the original mirror manager becomes the mirror plex.

- 5 Click **OK** to complete the change.

The Job Manager opens (see page 115) and the job begins.

Failing Over a Mirrored Volume

When a data-access problem occurs on a mirrored volume, *failover* (from the original volume to the mirror) occurs automatically. You can also force a failover. You might want to do this if:

- You want to test the failover setup.
- You need to take the volume (or mirror manager) off-line for maintenance.
- You want to change the mirror priority. (See “Changing Mirror Priorities” on page 75 for an alternative to failover.)

Note You can't fail over a mirrored volume unless the mirror is fully synchronized.

To fail over a mirrored volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Fail over mirror**.
- 3 Click **Yes** to fail over the mirror.

The mirror is failed over. Any system that was accessing the original volume automatically begins to access the mirror instead.

Failing Back a Mirrored Volume

When a data-access problem occurs on a mirrored volume, *failover* (from the original volume to the mirror) occurs automatically. Use Adaptec Storage Manager to fail back the mirrored volume and restore the original volume to mirror manager after the problem has been solved.

Note You can't fail back a mirrored volume unless the mirror is synchronized.

To fail back a mirrored volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Fail back mirror**.

- 3 Click **Yes** to fail back the mirror.

The mirror is failed back—the original volume is restored as the mirror manager.

Breaking a Mirrored Volume

You can *break* a mirrored volume so that data on the original volume is no longer duplicated on the second volume.

Note When you break a mirrored volume, you can change the duplicate volume into a new, independent volume by mounting it to a new location.

To break a mirrored volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, select the mirrored volume you want.
- 3 In the **Actions** menu, select **Break mirror**.

The Break Mirror window opens.

- 4 To break the mirror without retaining the duplicate volume, skip to Step 5.

To mount the duplicate volume to a new location:

- a From the iSCSI Storage Host drop-down list, select an iSCSI Storage Host on which to mount the volume. (Only iSCSI Storage Hosts are listed.)
- b Select a drive letter for the volume. (Only available drive letters are listed.)
Alternatively, type the full path to an existing empty directory.

- 5 Click **OK**.

Removing an Unavailable Mirror Plex

If a mirror plex becomes unavailable (due to a power failure or a failed disk drive, for instance), follow the instructions in this section to permanently disassociate it from the mirror manager.

Note To remove an online mirror plex, see “Breaking a Mirrored Volume” on page 77.

To remove an unavailable mirror plex:

- 1 In the Volumes View, select the mirrored volume.
- 2 In the Actions menu, select **Remove remote plex association**.
- 3 Click **Yes**.

The association is broken permanently, and the mirror plex can no longer be used for storage (even if it becomes available again). To recover the storage space, delete the underlying logical device (see page 105).

Deleting a Mirrored Volume

You can delete a volume, if required.

Caution When you delete a volume or mirrored volume, all data is destroyed.

To delete a volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Delete volume**.
- 3 Click **Yes** to delete the volume.

The Job Manager opens (see page 115) and the job begins.

Backing Up Your Data with Replicas

Replica is an upgrade feature. If the replica feature is locked, you must purchase the feature key from Adaptec Web site.

Replicas are only supported on Windows and Linux operating systems.

Adaptec Storage Manager's replication requires at least two iSCSI Storage Hosts, one deployed at a primary site, and one deployed at a secondary site. Data from a primary site (source) is copied to a secondary site (destination replica). After the data is copied, the destination replica can be broken away and mounted on the secondary site.

To break an existing replica, see page 80.

Specifying Replica Site

Note To avoid a corrupted replica, ensure that no files are open or in use on the source logical drive before you begin this task.

Before creating a replica for a iSCSI host, add a destination replica site.

To add a replica site,

- 1 In the Enterprise View, select the iSCSI Storage Host you want replicate.
- 2 Right-click on the host and click **Management Service Actions** and then click **Manage Replica Site Access**.
- 3 The Manage Replica Site Access dialog opens.
- 4 Click **Add**.

- 5 The Add Replica dialog opens.
- 6 Enter the required details about the destination site and click **Add**.

Creating Replicas

Adaptec Storage Manager includes a replica wizard to help you create a replica at the specified replica site. A replica can include one volume or multiple volumes, including mirrored volumes.

To create a replica,

- 1 In the Enterprise View, select the iSCSI Storage Host.
- 2 In the Volumes View, select the volume you want to replicate.
- 3 Click the **Create Replica** button. Or, in the Actions menu, select **Create Replica**.
The replication wizard opens.
- 4 Select the logical device(s) you want to include in the replica set.
Note If the logical device you select has dependent volumes listed, Adaptec strongly recommends that you copy the volume and its dependencies, to avoid losing related data.
- 5 Type a name or description for the replica, then click **Next**.
- 6 Select the management service for creating the replica.
 - Set the Compression: Enabled or Disabled
 - Set the CRC: Enabled or Disabled
- 7 Click **Next**.
- 8 Select the replica pool for each volume in the replica set. Then click **Apply** to create the replica immediately or, click **Schedule** to schedule the replica update for a later time.

When the replica has been created, it appears in the Enterprise View. Select any replica in the Enterprise View to open the Replica View.

Updating Replica Set

- 1 In the Replica View, select the Replica set section name.
- 2 Right-click the replica set and select **Update Replica Set**.
The Update replica screen opens.
- 3 Select **Update Now** to update the replica set immediately or **Scheduled Update** to schedule a replica update.

Aborting a Replica Set Update

- 1 To abort a replica set update. Right-click the replica set and select **Abort Replica Set Update**.
- 2 Click **Yes** to confirm the abort.

Switching Roles

To change the destination replica site, you need to switch the role of the secondary site management service.

Note Note: Before switching the roles for a replica set, make sure the source volume is logged out of the initiator.

- 1 Right-click the replica set and select **Switch roles**.
- 2 Select the secondary site management service to switch the roles and click **OK**.

1 Re-Establishing a Replica Set

To reset the replica details,

- 1 Right-click the replica set and select **Re-establish Replica Details**.
- 2 Select the secondary site management service to switch the roles and click **OK**.

Mounting a Replica Set

To mount a replica set to a specific iSCSI appliance,

- 1 Right-click the replica set and select **Mount Replica Set**.
- 2 Select an iSCSI appliance as the Mount Point and select the Drive to mount the replica volume.

Unmounting a Replica Set

To unmount a replica set,

- 1 Right-click the replica set and select **Unmount Replica Set**.
- 2 Click **Yes** for confirmation.

Breaking a Replica Set

Note You can not break an individual replica. You can only break an entire replica set.

- 1 In the Replica View, select the Replica set section name.
- 2 Click the **Break Replica** button . Or, in the Actions menu, select **Break Replica Set**.

- 3 Click **Yes** to break the replica set.

Scheduling Replica Update

If a job is lengthy and limits access to your iSCSI Storage Appliance, you may want to set a date and time for the job to complete, instead of running the job while there is activity on your IP SAN. If a job must be performed regularly, you can schedule it to recur at preset times.

To Schedule a Replica Update

- 1 Create the Replica, completing each step of the task until you are prompted to click **Schedule**.

The schedule window opens.

If you want the update to occur regularly, set the frequency, and set the number of replicas to retain at one time.

- 2 Set the date and time for the update.

Note Keep geography in mind – If you are scheduling jobs on an iSCSI Storage Appliance located in another geographical area, remember that the time you set for a scheduled job is the Management Service's time, which may be different from the local time or the iSCSI Storage Appliance's time. You will be prompted to select a new time if the one you've set occurs in the past on the Management Service.

- 3 Click **Apply**.

The job is saved in the Schedule Manager.

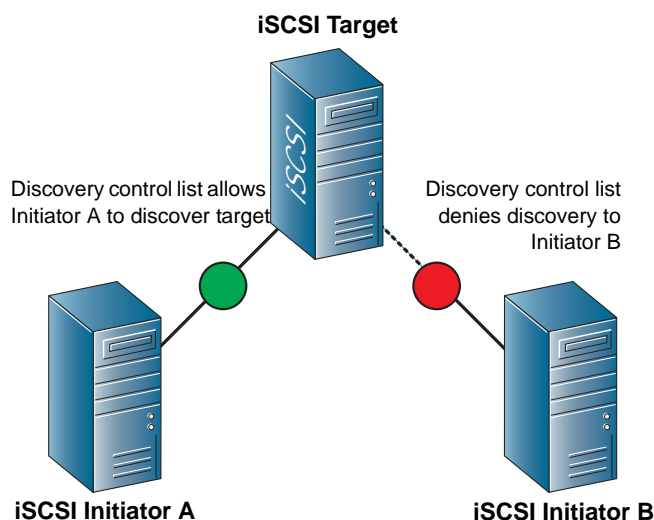
Caution If you set up a recurring job that creates and mounts a snapshot on the same disk drive, you must free the disk drive after each job or the job will fail.

Controlling Access to Your IP SAN

This chapter describes how to use Adaptec Storage Manager to restrict and control access to your IP SAN and iSCSI targets (logical devices) with auto-discovery control lists, authentication, and the Security Manager.

Limiting Discovery of iSCSI Targets with Discovery Control Lists

If you want to limit which iSCSI initiators can discover an iSCSI target (logical device), you can create a discovery control list which will allow one or more specified iSCSI initiators to discover an iSCSI target while preventing other iSCSI initiators from discovering it, as illustrated in this figure.

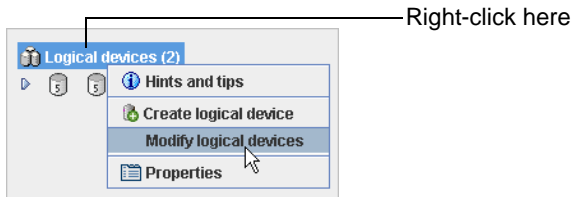


Each iSCSI target can have its own auto-discovery control list, with specified iSCSI initiators that are permitted to discover it.

Note Discovery control lists don't prevent iSCSI initiators from logging into iSCSI targets that aren't on their control lists. If you are using iSNS to discover iSCSI targets and want to control which logical devices are logged into by which iSCSI initiators, you must set CHAP authentication. Without CHAP authentication, all iSCSI initiators will be able to log in to all iSCSI targets. See "Controlling Access to Your IP SAN with Authentication" on page 85 for more information.

Modifying a Discovery Control List

- 1 In the Enterprise View, click the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, right-click the words '**Logical devices**', then select **Modify logical devices**.



The wizard opens. See the figures in “Provisioning Storage Manually” on page 42 for more information.

- 3 At the top of the wizard, click the tab of the pool you want, then click **Next**.
The next screen of the wizard opens.

- 4 Click **Add Initiator**.

The Add iSCSI Initiator window opens.

- 5 Enter the IQN (iSCSI Qualified Name) assigned to the iSCSI initiator installed on your system.
- 6 Enter a name (or *alias*) for the initiator. The name must begin with an alphabetic character, and can contain only letters and numbers.
- 7 (Optional – Advanced users only) Click **Advanced settings** to enable or disable Protocol Data Unit and iSCSI ping settings.

Note Refer to your iSCSI initiator’s documentation for more information about the advanced settings.

- 8 Click **OK**.

The iSCSI initiator appears in the Initiators drop-down menu.

- 9 Repeat Steps 4 to 8 to add more initiators, if required.
- 10 From the Initiators drop-down menu, select the initiator you want.
- 11 From the list of logical devices, select the logical device(s) that you want the selected initiator to discover, then click the right arrow (>).

If you want the selected initiator to discover *all* the logical devices, click the double right arrows (>>).

- 12 Repeat Steps 10 and 11 for each iSCSI initiator.

Note Each logical device can support up to 32 iSCSI initiators.

13 Click **Next** again, then review the configuration summary.

Click **Back** to change the configuration.

14 Click **Apply**, then click **Yes**.

The logical devices are created or modified, and iSCSI initiator assignments are saved in the iSCSI Storage Appliance.

Controlling Access to Your IP SAN with Authentication

When you create a new volume (see page 40) or logical device (page 42), you can set an authentication method so that any server that attempts to log in to your iSCSI Storage Appliance is forced to authenticate itself.

Note Supported authentication methods vary by iSCSI initiator. Refer to your iSCSI initiator documentation for more information.

Once an authentication method is set, any server trying to log in without authentication, or with the incorrect authentication, is rejected.

Two authentication methods are available in Adaptec Storage Manager:

- **Challenge Handshake Authentication Password (CHAP)**—Default setting

Note If you are using iSNS (see page 163) to discover iSCSI targets and want to control which iSCSI targets can be logged into by which iSCSI initiators, you must set CHAP authentication. Without CHAP authentication, all iSCSI initiators will be able to log in to all iSCSI targets.

- **Secure Remote Password (SRP)**

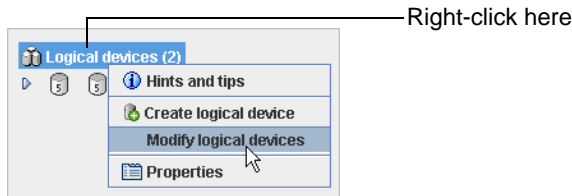
You can choose not to set any authentication method. When authentication for a provisioned volume or logical device is set to None, the authentication method (if any) is set by the iSCSI initiator instead of your iSCSI Storage Appliance, and your iSCSI Storage Appliance allows a server to log in when the server bypasses security or when the server-requested authentication is completed successfully.

Modifying the Authentication Settings

You can add authentication, change authentication methods, or remove authentication from any provisioned volume or logical device. You can change the access settings for any provisioned volume or logical device.

To change an authentication setting:

- 1 In the Logical Devices View, right-click the words **Logical devices**, then select **Modify logical devices**.



The wizard opens.

- 2 Change the authentication settings as required. (For more detailed instructions, see Step 7 of “Provisioning Storage Manually” on page 42.)
- 3 Click **Next** to continue, click **Next** again, then review the configuration summary. Click **Back** to change the configuration.
- 4 Click **Apply**, then click **Yes**.

The authentication settings are modified.

Limiting User Access to Your IP SAN with the Security Manager

To protect your IP SAN, you can use Adaptec Storage Manager’s Security Manager to control which users can access and modify your iSCSI storage.

Each Adaptec Storage Manager user is given a password and is assigned one of two access privilege levels, *Administrator* level or *Operator* level (see page 87). To access Adaptec Storage Manager and your IP SAN, the user enters his or her password when logging in to the Management Service (see Step 2 on page 35).

Note Multiple users can be logged into the same Management Service at the same time.

A user is associated with a specific Management Service. If your IP SAN includes more than one Management Service, you can:

- Add the same user to all Management Services, or limit that user to specific Management Services only.
- Assign the same user different privilege levels on different Management Services.

Understanding Access Privilege Levels

This section describes the two access privilege levels supported by Adaptec Storage Manager.

Administrator Level

Administrators have full access to your IP SAN, and can manage and modify your iSCSI storage as required.

Adaptec Storage Manager requires at least one Administrator-level user.

Operator Level

Operators have restricted access to your IP SAN, as described in this table.

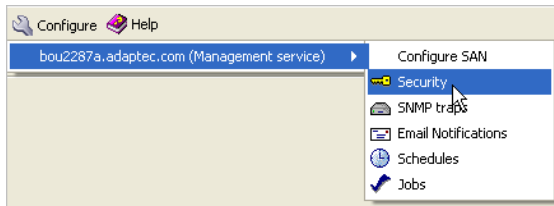
Operators can...	Operators can't...
Blink a hardware component, such as a disk driver or iSCSI Storage Appliance	Provision storage to an iSCSI Storage Host
View Properties window of all storage components of your IP SAN	Create, modify, or delete a pool, volume, or logical device
Verify a pool	Mirror a volume or modify or break a mirrored volume
Create a hot spare	Create or delete a snapshot
View event logs	
Save a support archive	
Change Adaptec Storage Manager preferences	
View online Help	

Opening the Security Manager

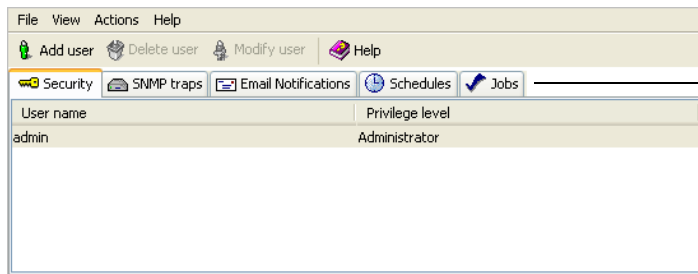
This section describes how to open the Security Manager and add users.

To configure the Security Manager:

- 1 In the Enterprise View, select the Management Service.
- 2 In the **Configure** menu, select the Management Service you want, then select **Security**.



The Security Manager opens on the Security tab of a new window.



You can access other utilities in this window, such as the Schedule Manager (see page 71), by clicking their tabs.

By default, a single user — with the administrator name and password that you added during Adaptec Storage Manager installation — is included on the Security List. You can add, modify, and delete users as your requirements change:

- To add a user, see the next section.
- To modify a user's name or password, see page 89.
- To delete a user, see page 89.

Adding a User to the Security Manager

To add a user to the Security Manager:

- 1 Open the Security Manager (see page 88).
- 2 In the tool bar, click **Add user**.

The User Properties window opens.

- 3 Enter a user name, then enter and confirm a password for that user. You *must* enter a password.

Note Be sure to note the passwords you enter; they won't appear anywhere on-screen in the Security Manager. Security passwords are case-sensitive.

- 4 Select a Privilege Level from the drop-down menu. (See "Understanding Access Privilege Levels" on page 87 for more information.)

- 5 Click **Add**.

The user appears in the Security Manager.

- 6 Continue adding users as required for your IP SAN.

Modifying a User's Information

To change a user's name or password:

- 1 Open the Security Manager (see page 88).
- 2 Select the user's name, then click **Modify user**. (Alternatively, double-click the user's name.)

The User Properties window opens.

- 3 Modify the user's information as required, then click **Modify**.

Note Be sure to note the passwords you enter; they won't appear anywhere on-screen in the Security Manager. Security passwords are case-sensitive.

The new information is saved in the Security Manager.

Removing a User from the Security Manager

You can remove any user from the Security Manager. (At least one user with Administrator-level privileges must remain.) Once a user has been deleted, he or she no longer has access to your IP SAN through Adaptec Storage Manager.

To remove a recipient from the Security Manager:

- 1 Open the Security Manager. (See page 88.)
- 2 Select the user's name, then click **Delete user**.
- 3 Click **Yes** to confirm the deletion.

The recipient is removed from the Security Manager and no longer has access your IP SAN through Adaptec Storage Manager.

Modifying Your iSCSI Storage

This chapter explains how to add new pools, volumes, and logical devices to your IP SAN, and how to modify those components as your iSCSI storage needs change. It also describes how to add more iSCSI Storage Appliances, iSCSI Hosts, and Management Services to your IP SAN.

Adding More Components to Your IP SAN

You can add additional Management Services, iSCSI Storage Appliances, and iSCSI Storage Hosts to your IP SAN at any time.

- To add a Management Service, see the next section.
- To add an iSCSI Storage Appliance, see page 92.
- To add an iSCSI Storage Host, see page 92.

Adding a Management Service

If you have installed a Management Service on another system and want to use it to manage new iSCSI Storage Appliances, follow the instructions in this section to add that Management Service to Adaptec Storage Manager.

Note An iSCSI Storage Appliance can be associated with (or *added to*) only one Management Service at a time. An iSCSI Storage Appliance already being managed by an existing Management Service can't be added to a new Management Service.

- 1 In the Enterprise View, select **iSCSI Storage**.
- 2 In the Actions menu, click **Add management service**.
The Login to Management Service window opens.
- 3 Enter the name or TCP/IP address of the system on which the Management Service is installed, then enter the Administrator user name and password that you set when you installed Adaptec Storage Manager.
- 4 Click **Connect**.

The Management Service is added to the iSCSI Storage branch.

Adding an iSCSI Storage Appliance

If you have installed additional iSCSI Storage Appliances, follow these instructions to add them to Adaptec Storage Manager.

Note An iSCSI Storage Appliance can be associated with (or *added to*) only one Management Service at a time.

- 1 In the Enterprise View, select the Management Service.
- 2 In the Actions menu, click **Add iSCSI storage appliance**.
The Add iSCSI Storage Appliance window opens.
- 3 Enter the host name or TCP/IP address of your iSCSI Storage Appliance, then click **Add**. The TCP/IP address appears on the front panel LCD display of your Snap Server 700i Series.

The iSCSI Storage Appliance is added to the Management Service.

Using the Wizard

- 1 In the Enterprise View, select the Management Service.
- 2 In the Actions menu, click **Configure SAN**.
The wizard opens.
- 3 Click **Add new iSCSI storage appliance**.
The Add iSCSI Storage Appliance window opens.
- 4 Enter the host name or TCP/IP address of your iSCSI Storage Appliance, then click **Add**. The TCP/IP address appears on the front panel LCD display of your Snap Server 700i Series.

The iSCSI Storage Appliance is added to the Management Service.

Adding an iSCSI Storage Host

To add a new iSCSI Storage Host to Adaptec Storage Manager:

- 1 In the Enterprise View, select the Management Service.
- 2 In the Actions menu, click **Add iSCSI storage host**.
The Add iSCSI Storage Host window opens.
- 3 Enter the host name of an iSCSI Storage Host. Alternatively, if you assigned a static IP address to the iSCSI Storage Host, enter it instead of the host name.
- 4 Click **Add**.

The system is added to the Management Service. To provision storage to the system, see “Provisioning Storage Automatically” on page 40.

Using the iSCSI Storage Appliance Wizard

1 In the Enterprise View, select the Management Service.

2 In the Actions menu, click **Configure SAN**.

The wizard opens.

3 Click **Add new iSCSI storage appliance**.

The Add iSCSI Storage Appliance window opens.

4 Enter the host name of an iSCSI Storage Host. Alternatively, if you assigned a static IP address to the iSCSI Storage Host, enter it instead of the host name.

5 Click **Add**.

The system is added to the Management Service. To provision storage to the system, see “Provisioning Storage Automatically” on page 40.

Capacity Limitations

This section lists the capacity limitations for the components in your IP SAN.

Component Description	Capacity Limitation
Number of pools in an iSCSI Storage Appliance	20
Maximum pool size	512 TB
Number of characters in a pool name	Up to 15
Physical devices in a RAID 5 or RAID 6 pool	16
Physical devices in a RAID 0 or RAID 10	100 Note: Each RAID 5 or RAID 6 leg may not have more than 16 physical devices
Physical devices in a RAID 1 pool	2
Logical devices in a pool	512
Logical devices supported by an iSCSI Storage Appliance	512
Number of characters in a logical device name	Up to 32
Maximum pools	20
Maximum volumes/logical devices	512—includes basic, snapshot, mirrored, replica source, replica destination, and cloning
Maximum snapshots	256—includes snapshots, replica source, replica destination, and cloning

Component Description	Capacity Limitation
Maximum mirror plexes	20— includes any combination of master/slave
Maximum replica volumes	40— includes any combination of source/destination Each replica volume consumes 1 volume and 2 snapshots.
Maximum clones	20—while clone is in progress, consumes 1 volume and 1 snapshot. On completion, the cloned volume will become a basic volume

Creating and Modifying Pools

In Adaptec Storage Manager, a storage pool is created by grouping disk drives together to form a virtual storage unit. Each pool includes RAID (the RAID level depends on how many disk drives are in the pool) and can also include a hot spare for an additional level of data protection. Logical devices and volumes are then built from the storage space contained within that pool.

Once a pool is created, you can use Adaptec Storage Manager to increase its capacity, change its RAID level, and make other modifications.

This section describes how to:

- Create a new pool after setup is complete (see the following section).
- Create a pool using express configuration (see page 95)
- Add capacity to an existing pool (see page 96).
- Change the RAID level of a pool (see page 96).
- Move a pool to another iSCSI Storage Appliance (see page 97).
- Enable or disable the controller read or write cache for a pool (see page 100).
- Delete a single pool (see page 101) or all pools (see page 101).

Creating a New Pool

You can add new pools to your IP SAN at any time, as long as adequate disk drive space is available. You can provision storage from a new pool *immediately*. You don't have to wait for the build/verify process to complete.

To create a new pool:

1 In the Enterprise View, select the iSCSI Storage Appliance.

2 On the toolbar, click **Create**, then select **Create Pool**.

Alternately, click the **Create Pool** button in the Logical Devices View, as shown above right.



The wizard opens.

3 Select a configuration method:

- If you select **Express configuration...**, continue with “Creating Pools Using Express Configuration” on page 95.
- If you select **Custom configuration...**, continue with “Step 3: Creating RAID Pools” on page 38.

Creating Pools Using Express Configuration

Adaptec Storage Manager offers two methods for creating pools — express configuration and custom configuration. This section describes how to use the express configuration method.

Note For instructions on creating pools using custom configuration, see “Step 3: Creating RAID Pools” on page 38.

About the Express Configuration Method

When you use express configuration, Adaptec Storage Manager automatically creates pools by grouping together same-sized physical disk drives, and assigns RAID levels based on the number of physical disk drives in a pool:

- A pool with three or more physical disk drives is assigned RAID 5.
- A pool with two physical disk drives is assigned RAID 1.
- A pool with only a single physical disk drive becomes a simple volume, which does not offer redundancy.

Note To create a pool with any other RAID level, you must use the custom method, as described in “Step 3: Creating RAID Pools” on page 38. See “RAID Quick Reference” on page 201 for more information about RAID levels.

SAS and SATA disk drives are grouped in separate pools. The maximum number of pools created depends on the number of disk drives in your iSCSI Storage Appliance. Up to 20 pools are supported on a single iSCSI Storage Appliance.

Pool size is set by Adaptec Storage Manager and automatically maximizes the capacity of the disk drives. Pool size can’t be adjusted during creation, even using custom configuration. (To change pool size after a pool has been created, see “Adding Capacity to a Pool” on page 96.)

Creating Pools with the Express Method

To create pools:

- 1 Select **Express configuration...**, then click **Next**.

- 2 Review the information that is displayed.

To exclude specific disk drives or to make other changes, click **Modify pools**. See Step 5 on page 39 for more information.

- 3 Click **Apply**, then click **Yes** to confirm.

The pool is created. You can provision storage from a new pool *immediately*, without waiting for the build/verify process to complete.

Caution Don't remove any drive included in the pool while the pool is building.

Adding Capacity to a Pool

You can add disk drives to an existing pool to *expand* its capacity without changing its RAID level. When you expand a pool, stored data is distributed (or *migrated*) across all the original and new disk drives.

You can expand pools with any of these RAID levels: RAID 0, RAID 5, RAID 6, or RAID 10. The maximum supported size for a pool is 512 TB.

To increase the capacity of a pool:

- 1 In the Logical Devices View, select the pool you want.

- 2 In the Actions menu, click **Expand or migrate pool**.

The wizard opens to the Choose RAID Level window. (*Don't change the RAID level.*)

- 3 Click **Next**.

The Modify Pool window opens.

- 4 Select available disk drives to add to the pool. Unavailable disk drives are indicated by blue check marks.

- 5 Click **Next**, then review the pool settings.

- 6 Click **Apply**, then click **Yes** to expand the pool.

The capacity of the pool is increased. You can use the new storage space right away.

Changing a Pool's RAID Level

If your requirements change, you can change the RAID level of an existing pool. You might want to do this to increase the capacity or performance of a pool, add redundancy to a pool, or to make disk drive space available for other uses.

When you change the RAID level of an existing pool, stored data is migrated across existing and new disk drives.

This table lists supported migrations:

From RAID Level	To RAID Level
Simple Volume	RAID 1
RAID 0	RAID 5 or RAID 10
RAID 1	RAID 5 or RAID 10
RAID 5	RAID 10 or RAID 6

You can also migrate from RAID 1 or RAID 5 to RAID 0. If the pool has a spare drive associated with it, the RAID 0 pool retains the spare drive.

Note Migrations that do not involve a change in RAID level are also supported in RAID 0, RAID 1, RAID 5, and RAID 6. See “Adding Capacity to a Pool” on page 96 for more information.

To change the RAID level of a pool:

- 1 In the Logical Devices View, select the pool you want.
- 2 In the Actions menu, click **Expand or migrate pool**.
The wizard opens to the Choose RAID Level window.
- 3 Select a new RAID level. (Only supported RAID levels are listed.)
- 4 Click **Next**.
The Modify Pool window opens.
- 5 If prompted, select additional disk drives to support the new RAID level.
- 6 Click **Next**, then review the pool settings.
- 7 Click **Apply**, then click **Yes** to change the pool’s RAID level.
The RAID level is changed.

Moving a Pool to Another iSCSI Storage Appliance

You can move an existing pool to another iSCSI Storage Appliance, if required. When you move a pool, you transfer its RAID data and transfer its disk drives to the new appliance.

About Foreign and Alien Pools

To move a pool, first you export it from the original iSCSI Storage Appliance. An exported pool is referred to as a *foreign pool*. Then, you import the foreign pool to the new iSCSI Storage Appliance.

If an error (for instance, a power failure) occurs while a pool is being created, and the pool is only partially completed, it's referred to as an *alien* pool. In Adaptec Storage Manager, alien pools are grayed out in the Logical Devices View and can't be used to store data. You should delete alien pools from Adaptec Storage Manager.

Moving a Pool

You must complete these basic steps to move a pool to another iSCSI Storage Appliance:

- 1 Export the pool. (Exporting a pool prepares its RAID configuration for transfer.)
- 2 Move the disk drives that comprise the pool to the new iSCSI Storage Appliance.
- 3 Import the pool.
- 4 Reset authentication on any logical devices in the pool.

Notes 1) Ensure that no iSCSI initiators are accessing a pool before you attempt to export it. Pools being accessed can't be exported. 2) Adaptec recommends that you not export a pool while it is building, rebuilding, or synchronizing. If you do, it appears as an alien pool when you import it to a new iSCSI Storage Appliance.

To move a pool to another iSCSI Storage Appliance:

Note If possible, record the authentication settings of any logical devices in the pool. Ideally, you should re-use the same settings when resetting authentication.

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, select the pool you want.
- 3 In the **Actions** menu, select **Export pool**.
- 4 Click **Yes** to export the pool.

The pool's status changes to *foreign*.

- 5 Shut down *both* iSCSI Storage Appliances – the appliance you are exporting from *and* the appliance you are importing to. See “Shutting Down the iSCSI Storage Appliance” on page 110 for instructions.
- 6 Move the disk drives that comprise the pool to the new iSCSI Storage Appliance, following the manufacturer's instructions.
- 7 Power on the new iSCSI Storage Appliance.

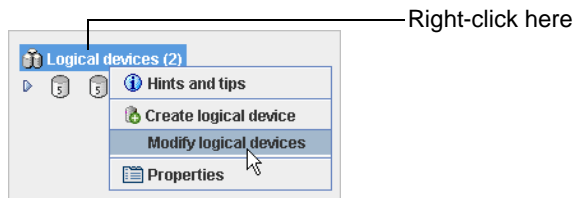
- 8 In the Enterprise View of Adaptec Storage Manager, select the new iSCSI Storage Appliance.
- 9 In the Logical Devices View, select the pool you just exported.
Note Only one foreign pool at a time can appear in Adaptec Storage Manager.
- 10 In the **Actions** menu, select **Import pool**.
- 11 Click **Yes** to import the pool.
The pool is imported to the new iSCSI Storage Appliance. This process can take up to three minutes.

Resetting Authentication on Imported Logical Devices

If authentication was set on any logical devices before you exported the pool, it must be reset once the pool is imported.

To reset authentication:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, right-click the words '**Logical devices**', then select **Modify logical devices**.



The wizard opens to the Define Logical Devices screen.

- 3 At the top of the wizard, click the tab of the pool you want.
The logical devices for that pool are displayed.
- 4 (*Optional*) Click inside the Authentication box next to a logical device and select the authentication method.
Note If possible, re-use the authentication settings that were set before you moved the pool. If the pool contains automatically provisioned volumes, use new

authentication settings. (You must also reconfigure your iSCSI Storage Hosts with these new settings.)

- If you select **CHAP**—Click **Set CHAP secret**, enter a user name and password, then click **Add**. Click **Cancel** to close the window.

Note If you are using CHAP with the Microsoft iSCSI initiator, the CHAP password must be 12–16 characters long or it will be rejected by the iSCSI initiator.

- If you select **SRP**—Click inside the **Scope** field to type a unique name for the scope, or choose an existing name from the drop-down menu.

5 Click **Next**, click **Next** again, then review the configuration summary.

6 Click **Apply**, then click **Yes**.

The new settings are saved in the iSCSI Storage Appliance.

Changing the Controller Cache Settings for a Pool

For each pool, you can use Adaptec Storage Manager to enable or disable the read and write cache of the RAID controller installed in your iSCSI Storage Appliance.

Enabling or Disabling the Controller Write Cache

Caution Before you change a cache setting, be sure that you fully understand the implications of the new setting.

To enable or disable the controller write cache settings for a pool:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, select the pool you want.
- 3 In the **Actions** menu, select **Configure write cache**, then select either **Enabled** or **Disabled**.
- 4 Click **Yes** to change the cache setting.

The setting is changed.

Enabling or Disabling the Controller Read Cache

Caution Before you change a cache setting, be sure that you fully understand the implications of the new setting.

To enable or disable the controller write cache settings for a pool:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, select the pool you want.

3 In the **Actions** menu, select **Configure read cache**, then select either **Enabled** or **Disabled**.

4 Click **Yes** to change the cache setting.

The setting is changed.

Deleting an Individual Pool

You can delete an individual pool (and all the logical devices that are defined in that pool) if your requirements change. To delete all pools at once, see page 101.

Before you begin, ensure that you have backed up any data that you want to save. When the pool is deleted, any data or programs stored on that pool are also deleted.

To delete a pool:

1 In the Enterprise View, select the iSCSI Storage Appliance you want.

2 In the Logical Devices View, select the pool you want to delete.

3 In the **Actions** menu, select **Delete pool**.

4 Click **Yes** to delete the pool.

The pool is deleted.

Note Depending on your OS, the drive-letter assignments of any remaining drives may change after a pool is deleted and the system is rebooted.

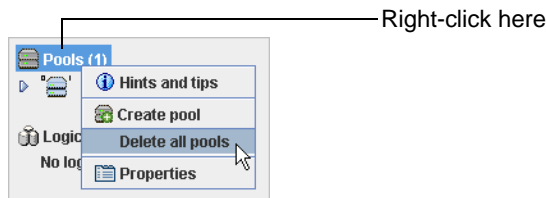
Deleting All Pools

Caution Deleting all pools destroys all data in the iSCSI Storage Appliance. Before you begin, ensure that you have backed up any data that you want to save.

To delete all pools in an iSCSI Storage Appliance:

1 In the Enterprise View, select the iSCSI Storage Appliance you want.

2 In the Logical Devices View, right-click the word '**Pools**', then select **Delete all pools**.



3 Click **Yes** to delete all the pools.

The pools are deleted.

Creating and Modifying Volumes

When Adaptec Storage Manager provisions storage to an iSCSI Storage Host, it creates a logical device, automatically logs into it from the iSCSI Storage Host, and formats it. The result is a *volume*—in Adaptec Storage Manager, a volume is a logical device that has been automatically provisioned to an iSCSI Storage Host.

Volumes appear in the Volumes View. On an iSCSI Storage Host, a volume appears as a local disk drive. Each volume in the Volumes View corresponds to a logical device in the Logical Devices View.

Note For information about storage provisioning on systems running Window XP, Linux, or VMware, see “Creating and Modifying Logical Devices” on page 104.

Once a volume is created, you can use Adaptec Storage Manager to modify it. This section describes how to:

- Create a new volume after setup is complete (see the following section).
- Add capacity to a volume (see page 103).
- Reassign a volume to a different iSCSI Storage Host (see page 103).
- Delete a volume (see page 104).

Note To mirror a volume to add another layer of data protection, see “Backing Up Your Data with Mirrored Volumes” on page 72.

Creating a New Volume

You can add new volumes to your IP SAN at any time, as long as adequate pool space is available.

To create a new volume:

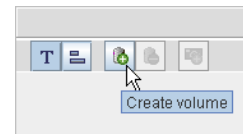
- 1 In the Enterprise View, select the iSCSI Storage Host you want. (To add a new iSCSI Storage Host, see page 92.)

Note A pool with available space must be available on your iSCSI Storage Appliance before you can build a volume or mirrored volume on an iSCSI Storage Host. (To create a mirrored volume, see “Backing Up Your Data with Mirrored Volumes” on page 72.)

- 2 In the **Actions** menu, select **Create volume** or click the **Create Volume** button.

The wizard opens.

- 3 Continue with Step 3 on page 41 of “Provisioning Storage Automatically”.



Adding Capacity to a Volume

You can increase the size of a volume, up to the space available in its pool.

To add capacity to a volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the volume you want, then select **Extend volume**. For help selecting the right volume, use the expansion arrows to display more volume information.

The Extend Volume window opens.

- 3 By default, the Extend By field is set to the space available in the pool. Adjust the number to suit your requirements, then click **OK**.

Note You must extend the size of a volume in multiples of 10 MB.

You can begin using the volume for storage *immediately*; you don't have to wait for the job to complete. The volume appears in the Volumes view with its new size.

Reassigning a Volume to Another iSCSI Storage Host

You can reassign a volume to a different iSCSI Storage Host on your IP SAN, or change the volume drive letter.

Note When you are reassigning a volume, the system it's being assigned to must be connected to the same Management Service as the original system.

To reassign a volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the volume you want, then select **Reassign volume**.

The Reassign Volume window opens.

- 3 Reassign the volume by selecting a different system from the iSCSI Storage Host drop-down list, or select a new drive letter or remote directory.
- 4 Click **OK**.

Caution If you are reassigning a volume, ensure that there is no activity on the volume before you continue. If the volume is in use, the reassignment will not complete successfully.

- 5 Click **Yes** to begin the job.

Deleting a Volume

You can delete a volume, if required.

Caution When you delete a volume, all data is destroyed.

To delete a volume:

- 1 In the Enterprise View, select the iSCSI Storage Host you want.
- 2 In the Volumes View, right-click the mirrored volume you want, then select **Delete volume**.
- 3 Click **Yes** to delete the volume.

The job begins.

Creating and Modifying Logical Devices

In Adaptec Storage Manager, a *logical device* is an iSCSI target accessed by the iSCSI initiators in the systems on your IP SAN. When you manually provision storage manually, you begin by creating a logical device that you then log into from the system and format locally. In Adaptec Storage Manager, logical devices appear in the Logical Devices View.

Note For more information about provisioning storage manually and automatically, see “Step 4: Provisioning Storage to Your Systems” on page 40.

Once a logical device is created, you can use Adaptec Storage Manager to modify it. This section describes how to:

- Create a new logical device after setup is complete (see the following section)
- Modify a logical device (see page 105)
- Delete a logical device (see page 105)

Note To create or edit the Discovery Control List for a logical device, see “Limiting Discovery of iSCSI Targets with Discovery Control Lists” on page 83.

Creating a New Logical Device

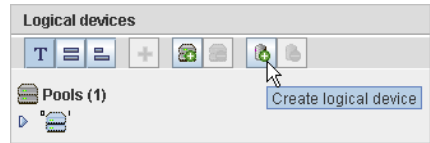
You can add new logical devices to your IP SAN at any time, as long as adequate pool space is available.

To create a new logical device:

- 1 In the Enterprise View, select the iSCSI Storage Appliance.
- 2 In the Logical Devices View, select any pool.

- 3 In the tool bar, click **Create**, then select **Create logical device**.

Alternately, click the **Create Logical Device** button in the Logical Devices View, as shown above right.



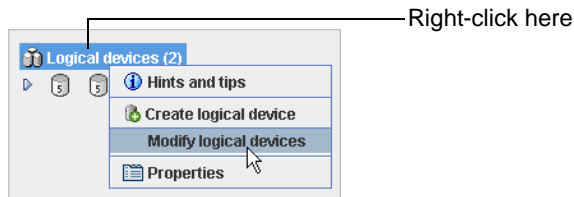
The wizard opens.

- 4 Continue with Step 3 on page 42 of “Provisioning Storage Manually”.

Modifying a Logical Device

You can change the size, name, and authentication method for any logical device. To modify a logical device:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, right-click the words ‘**Logical devices**’, then select **Modify logical devices**.



The wizard opens to the Define Logical Devices screen.

- 3 Click the tab of the pool you want.
The logical devices for that pool are displayed.
- 4 Adjust the logical device settings, as required. (See “Provisioning Storage Manually” on page 42 for more information.)
- 5 Click **Next**, click **Next** again, then review the configuration summary.

Notes To create or edit the Auto-discovery Control List for a logical device, see “Limiting Discovery of iSCSI Targets with Discovery Control Lists” on page 83.

- 6 Click **Apply**, then click **Yes**.

The new settings are saved in the iSCSI Storage Appliance.

Deleting a Logical Device

Caution Before you begin, ensure that you have backed up any data that you want to save. When the logical device is deleted, any data or programs stored on that logical device are also deleted.

To delete a logical device:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Logical Devices View, select the logical device you want.
- 3 In the **Actions** menu, select **Delete logical device**.
- 4 Click **Yes** to delete the logical device.

The logical device is deleted.

Maintaining Your iSCSI Storage Appliance

This chapter describes how to use Adaptec Storage Manager to configure the UPS monitor, blink devices, shut down and restart your iSCSI Storage Appliance, change the appliance settings, and update the Adaptec OnTarget operating system. For more information about your iSCSI Storage Appliance, see “Your Snap Server 700i Series” on page 189.

Note To add and configure a new iSCSI Storage Appliance after initial IP SAN setup is complete, see “Adding an iSCSI Storage Appliance” on page 92.

Configuring the Uninterruptible Power Supply (UPS) Monitor

You can use Adaptec Storage Manager to set the UPS monitor settings for each iSCSI Storage Appliance in your IP SAN. You can set customized UPS monitor settings for each separate iSCSI Storage Appliance.

You can monitor the UPS using either a USB or SNMP connection.

Note If the UPS broadcasts that it’s about to shut down, your iSCSI Storage Appliance will also shut down if it is connected to the UPS through an SNMP connection.

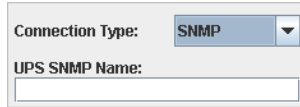
To configure UPS monitor settings:

- 1 In the Enterprise view, select the iSCSI Storage Appliance.
- 2 In the **Actions** menu, select **Configure UPS monitor**.

The Uninterruptible Power Supply (UPS) Configuration window opens.

3 Select a UPS connection type.

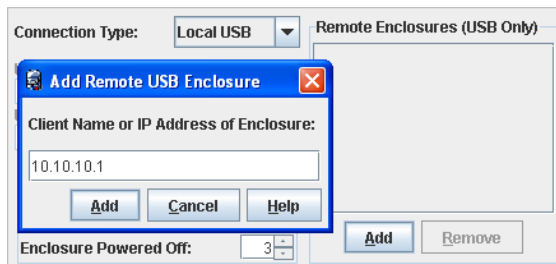
- If you select **SNMP**, enter the SNMP host name or TCP/IP address in the UPS SNMP Name field.



Connection Type: **SNMP**

UPS SNMP Name:

- If you select **Local USB**, click **Add**.



Connection Type: **Local USB**

Remote Enclosures (USB Only)

Add Remote USB Enclosure

Client Name or IP Address of Enclosure:

10.10.10.1

Add **Cancel** **Help**

Enclosure Powered Off: 3

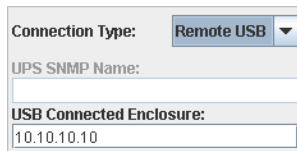
Add **Remove**

In the Add Remote USB Enclosure window, enter the name or IP address of a remote iSCSI Storage Appliance to which the local system will communicate UPS information, then click **Add**.

Repeat this step until you have added all the iSCSI Storage Appliances you want to communicate with the local USB connection.

Note To remove an iSCSI Storage Appliance from the list, select it, then click **Remove**.

- If you select **Remote USB**, enter the local USB host name or TCP/IP address in the USB Connected Enclosure field.



Connection Type: **Remote USB**

UPS SNMP Name:

USB Connected Enclosure:

10.10.10.10

4 In the Enclosure Powered Off box, set the battery life threshold at which the iSCSI Storage Appliance powers itself down. (The default is two minutes.)

5 Click **OK**.

Repeat the steps in this section for each iSCSI Storage Appliance in your IP SAN.








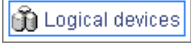
Blinking Appliances, Enclosures, and Disk Drives

You can blink the LEDs on your iSCSI Storage Appliances, enclosures, and the disk drives installed in your appliances and enclosures to identify where they are physically located.

To blink a component:

- 1 In Adaptec Storage Manager, right-click the component, then select **Blink...**

This table describes what to right-click to blink specific iSCSI Storage Appliances, enclosures, and disk drives.

Right-click...	To Blink...
 iSCSI Storage Appliance in the Enterprise View	The iSCSI Storage Appliance
 Controller icon in the Physical Devices View	All disk drives installed in an iSCSI Storage Appliance and attached JBODs
 Disk Drive icon	A specific disk drive
 Enclosure Management Device icon	An enclosure
 Pool icon	All disk drives included in a pool
 Logical Device icon	All disk drives included in a logical drive
 Pools (2) Text in the Logical Devices View	All disk drives included in all pools on a specified iSCSI Storage Appliance
 Logical devices Text in the Logical Devices View	All disk drives included in all the logical drives on a selected controller

The LEDs on the component begin to flash.

- 2 Click **OK** to stop blinking the component.

Shutting Down the iSCSI Storage Appliance

You can use Adaptec Storage Manager to shut down your iSCSI Storage Appliance. You might want to do this to export a pool to another iSCSI Storage Appliance (see page 97) or complete maintenance tasks.

Note Users can't access data on pools or logical devices on the appliance until it's restarted (see the following section).

To shut down the appliance:

- 1 In the Enterprise View, select the iSCSI Storage Appliance.
- 2 In the **Actions** menu, select **Shut down iSCSI Storage Appliance**.
- 3 Click **Yes** to shut down the appliance.

The appliance shuts down.

Shutting Down and Restarting the iSCSI Storage Appliance

To shut down and restart the appliance using Adaptec Storage Manager:

- 1 In the Enterprise View, select the iSCSI Storage Appliance.
- 2 In the **Actions** menu, select **Restart iSCSI Storage Appliance**.
- 3 The appliance restarts.

Note Restarting may take several minutes, during which time the data on the appliance won't be available.

Changing the iSCSI Storage Appliance's Settings

You can use Adaptec Storage Manager to change the network, date, and time settings for your iSCSI Storage Appliance.

To change the network settings using Adaptec Storage Manager:

- 1 In the Enterprise View, select the iSCSI Storage Appliance.
- 2 In the **Actions** menu, select **Configure iSCSI storage appliance**.

The wizard opens to the Configure iSCSI Storage Appliance step.

- 3 Edit the appliance settings, following the instructions in "Step 2: Configuring the iSCSI Storage Appliance" on page 36.
- 4 Click **Apply**, then click **Cancel** to close the wizard.

Updating the Adaptec OnTarget Operating System

As newer versions of the Adaptec OnTarget operating system become available, you can update your iSCSI Storage Appliance. Adaptec Storage Manager stores two versions (or images) at a time, so that if you experience problems with a newly downloaded one, you can revert to the previous image.

Note This task is recommended for advanced users only. If you are also updating to a newer version of Adaptec Storage Manager, complete that update before updating the controller image. See page 139 for more information.

New images for your iSCSI Storage Appliance are posted on the Adaptec Web site at www.adaptec.com. Image files have a .upgrade file extension. Once you have downloaded a new image, use Adaptec Storage Manager to update your iSCSI Storage Appliances.

- To apply a new image, see the following section.
- To see which image is currently in use, see page 112.
- To revert to a previous image, see page 112.

Applying a New Image

Caution Before you begin— Because all updated iSCSI Storage Appliances will be automatically rebooted after the image has been updated, stop all active applications before you begin.

To apply a new image:

- 1 In the Enterprise View, select **iSCSI Storage**.
- 2 In the **Actions** menu, select **Update controller images**.
- 3 Click **Yes** to continue this task.

The Adaptec ROM Update wizard opens.

- 4 Click **Next**.
- 5 Click **Add** to browse to the new image file you downloaded, select the file, then click **Open**.
- 6 In the wizard, click **Next**.
- 7 Select the iSCSI Storage Appliances you want to update, then click **Next**, then review the update summary.
- 8 Click **Apply**.

The image is updated. All updated iSCSI Storage Appliances are rebooted. (This may take a few minutes.)

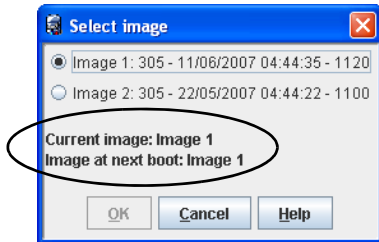
Checking the Current Image

To see what image is currently running:

- 1 In the Enterprise View, select the iSCSI Storage Appliance you want.
- 2 In the Physical Devices View, select the controller (shown at right).
- 3 In the **Actions** menu, select **Select controller image**.



The Select Image window opens.



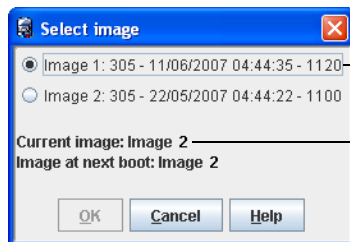
In the example above, Image 1 is the image running currently. Image 1 is also the image that will be used the next time the iSCSI Storage Appliance is rebooted or powered on.

Reverting to the Previous Image

Adaptec Storage Manager stores two versions (or images) of Adaptec OnTarget at a time. If you experience problems with a newly downloaded image, you can revert to the previous one. You can also return from the previous image to the new one, if required.

To choose the image to use the next time the iSCSI Storage Appliance is restarted or powered on:

- 1 Follow Step 1 to Step 3 of “Checking the Current Image” on page 112.
- 2 The Select Image window, select the controller image file you want, click **OK**.



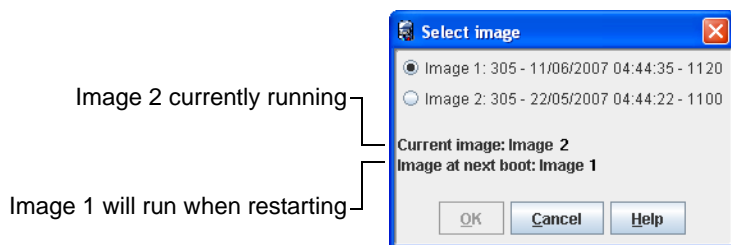
Example:

Select Image 1 to run when restarting

Image 2 is currently running

- 3 Click **Yes** to confirm the image change.

- 4 To check that the image you selected will be used after the iSCSI Storage Appliance is restarted, select the controller in the Physical Devices View, then in the **Actions** menu, select **Select controller image**.



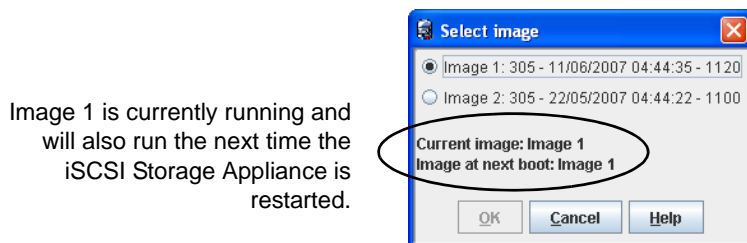
In the example above, Image 2 is still the current controller image but Image 1 is set to be the image the controller will use when you restart iSCSI Storage Appliance.

- 5 Click **OK**.

Caution Do not make any configuration changes before you restart the appliance. Any changes that you make will be lost when the appliance restarts.

- 6 Restart the iSCSI Storage Appliance (see page 110).

To check that the image you selected is running, select the iSCSI Storage Appliance in the Enterprise View, select the controller in the Physical Devices View, then in the **Actions** menu, select **Select controller image**. The Current Image should be the image you selected.



Monitoring Status and Activity

This chapter describes how Adaptec Storage Manager helps you monitor your IP SAN, iSCSI Storage Appliance, and any GuardianOS-powered Snap Servers on your network.

Monitoring Jobs in Progress

You can monitor jobs, such as automatic storage provisioning or creating a snapshot, as they progress by using a utility in Adaptec Storage Manager called the Job Manager. To open the Job Manager, see page 116.

The Job Manager opens on the Jobs tab of a new window.

File View Actions Help			
Undo job Resume job Quit job View job Help			
Security SNMP traps Email Notifications Schedules Jobs			
ID	State	Status	Description
2	Running	Step 5 in progress...	Create a 1024 MB Simple volume (F:) on host 'ip2k3test..
3	Running	Job not yet started	Create a 1024 MB Simple volume (F:) on host 'ip2k3test..
Done Step Step Description			
✓	1	Acquire locks for host & controller agents.	
✓	2	Read the SAN storage details.	
✓	3	Create new targets.	
✓	4	Create users as required.	
➡	5	Login each new target.	
	6	Login each new path to the target.	
	7	Create volume.	

In the Job Manager, the each step is listed and tracked separately. As each step is completed, a check mark appears in the Done column in the lower half of the window, as shown above.

The job's status is reported in the top half of the window, as shown in the previous figure. A job's status can be:

- **Running**—Job is in process and progressing normally.
- **Attention**—Job has failed.
- **Rolling back**—Completed steps are being undone.
- **Cancelling**—Job is being cancelled (the **Quit job** button has been clicked).

You can use Adaptec Storage Manager to monitor and manage jobs in progress:

- To open the Job Manager, see page 116.
- To cancel a job in progress, see page 116.
- To resume a cancelled job, see page 117.
- To undo a failed job, see page 117.

Opening the Job Manager

You can open the Job Manager at any time to monitor and manage jobs that are currently in progress. (This includes scheduled jobs that have begun.)

To open the Job Manager:

- 1 In the Enterprise View, select the Management Service.
- 2 In the **Configure** menu, select the Management Service you want, then select **Jobs**.

The Job Manager opens on the Security tab of a new window (see the figure on page 115), showing all running jobs.

- 3 Select any job to view its progress. Close the Jobs window when you're done.

Cancelling a Job in Progress

You can cancel a job in progress unless the job is in Attention status. (A job in Attention status must be *undone*, not cancelled. See page 117.) You might want to do this if the job requirements have changed, or if the job is no longer required.

Cancelling a job does not undo any steps that have been completed. To undo a job, see page 117. You can resume a job that is being cancelled in the Job Manager (see page 117)—once a job is fully cancelled, it can't be resumed.

To cancel a running job:

- 1 Open the Job Manager (see page 116).
- 2 Select the job you want to cancel, click **Quit job**, then click **Yes** to cancel the job.

The job's status changes to Cancelled.

To resume a job that is in the process of being cancelled, see page 117.

Resuming a Cancelled Job

You can resume a job that in the process of being cancelled in the Job Manager. A resumed job continues from the last step it completed before the job was cancelled.

Note Depending on the job, there may be very little opportunity time-wise to resume a cancelling job.

To resume a cancelled job:

- 1 Open the Job Manager (see page 116).
- 2 Select the job you want to resume, click **Resume job**, then click **Yes** to resume the job.
The job's status changes to Running, and the job continues with the next step on its list.

Undoing a Failed Job

If a job fails, you can choose to undo the steps that were completed before the failure, such as the creation of new users or targets.

To undo a failed job:

- 1 Open the Job Manager (see page 116).
- 2 Select the failed job you want to undo, then click **Undo job**.
- 3 Click **Yes** to undo the job.

The job's status changes to Rolling Back, and the completed steps are undone.

Viewing Status and Activity

You can see status information and messages about the activity (or *events*) occurring on your IP SAN by checking component properties and looking at the Event Viewer and status icons in Adaptec Storage Manager.

Using the Event Viewer and Event Log

The Event Viewer displays a log of activity occurring on your IP SAN. Status is indicated by icons (see page 119) in the left-hand column, as shown in the figure below.

Double-click any event to see more information in an easier-to-read format. Click **Next** to see the next event in the list.

	Date	Time	Source	Description
ⓘ	06/22/2007	03:59:20 PM PDT	OnTarget	Created pool Pool-1 (465.15GB (975482880 blocks))
ⓘ	06/22/2007	03:56:15 PM PDT	OnTarget	Destroyed pool Pool-1
ⓘ	06/22/2007	03:56:06 PM PDT	OnTarget	logical device 'Device-1' was destroyed
ⓘ	06/22/2007	03:56:02 PM PDT	OnTarget	logical device 'Device-2' was destroyed
ⓘ	06/22/2007	03:38:55 PM PDT	OnTarget	Created logical device with name 'Device-2' and IQN 'iqn.19...
ⓘ	06/22/2007	03:38:53 PM PDT	OnTarget	

Double-click to view event details.

Configuration event detail

Type: Information Source: OnTarget

Date: 6/22/07 Time: 3:56:15 PM PDT

Description

Destroyed pool Pool-1




Previous Next Close Help

To open a full-screen version of the event log, click the **Events** button in the tool bar.

To make it easier to find a specific event, click the column heads to sort the events. (Sort events by status icons to help you find specific Error- or Warning-level events.

What Do the Status Icons Mean?

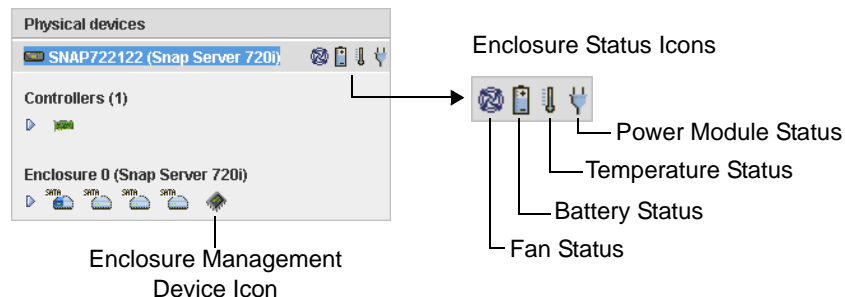
Adaptec Storage Manager indicates event status with icons. This table lists the three categories, or types, of events based on severity.

Icon	Status	Examples
	Information	<ul style="list-style-type: none">• A connection to the Management Service was successfully established.• A pool was created.• A volume was created.• A logical device was deleted.
	Warning	<ul style="list-style-type: none">• A volume is in a degraded state.• A disk drive is being rebuilt.• A hot spare in a pool has failed.• An enclosure fan or power supply has failed.
	Error	<ul style="list-style-type: none">• A pool has failed.• A disk drive within a pool has failed.• An iSCSI Storage Appliance is not responding.










Warning- and Error-level icons appear next to all components (such as iSCSI Storage Hosts and pools) affected by a failure or error, creating a trail that helps you identify the source of a problem. See “Identifying Failed or Failing Components” on page 148 for more information.

Viewing Enclosure Status

If your IP SAN includes an enclosure with an enclosure management device, such as a SCSI Accessed Fault-Tolerant Enclosure (SAF-TE) processor, Adaptec Storage Manager also displays temperature, fan, and power module status in the Physical Device view, as shown in the next figure.



The enclosure status icons change color to indicate status:

	Icon	Status	Examples
Enclosure Fan Status		Normal	Fans are working properly.
		Warning	A fan has failed. To determine which fan has failed, see “Identifying Failed or Failing Components” on page 148.
		Error	Multiple fans have failed.
Enclosure Temperature Status		Normal	Enclosure temperature is normal.
		Warning	Enclosure temperature is higher than normal.
		Error	Enclosure is overheating.
Enclosure Power Supply Status		Normal	Power supplies are working normally. To determine which fan has failed, see “Identifying Failed or Failing Components” on page 148.
		Warning	One power supply has failed.
		Error	Multiple power supplies have failed.

Note If your enclosure does not have an enclosure management device, the status icons appear but *do not* indicate status.

Viewing Component Properties

Double-click any component in the main window of Adaptec Storage Manager to view version numbers, status, model numbers, and other information about that component. (Alternatively, you can select any component, then click the **Properties** button in the tool bar.)

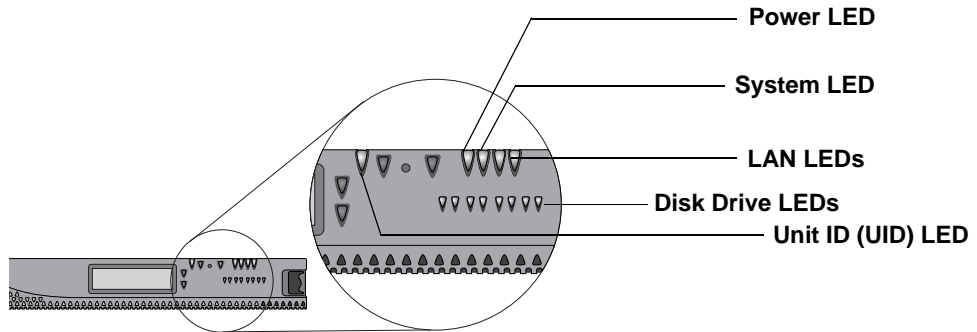
The properties listed vary, depending on which type of component you select.

Using Status and Drive Light Behavior to Monitor Components

This section describes how to use the LEDs on your Snap Server 700i Series and any SANbloc S50 expansion array to check the status of your IP SAN hardware components.

Snap Server 700i Series

The server has two status lights; two network lights on the front of the server (for ETH0 and ETH1); one or two network lights on the Network Interface Card on the rear of the server (for ETH2 and ETH3, if applicable); two lights for each of the four disk drives; and an identification light, as shown in the following illustration:



Adaptec recommends that you become familiar with the operation of these lights.

Power, System, and LAN LEDs

These status lights are located to the right of the power button. Looking at the server from the front, the lights appear in this order, from left to right: power LED, system LED, LAN 1 (ETH0) LED, and LAN 2 (ETH1) LED. The Disk Drive LEDs are below the status lights, and the identification (Unit ID) LED is to the right of the LCD display.

The LEDs operate as described in the following tables:

Power LED		
Solid green		The server is powered on.
Off		The server is powered off.
System LED		
Blinks green 2 times per second		The server is booting up.
Blinks green 3 times per second		The server is shutting down.
Solid or blinking amber at boot time		A problem was detected. The server will not boot.
Blinking amber during normal operation		A thermal problem was detected.
Solid amber		Other problem was detected.
LAN 1 and LAN 2 LEDs (ETH0 and ETH1)		
Solid green		The server is active and connected to the network.
Off		The port is disconnected or the Ethernet cable is not connected or linked to an active switch.
LAN 3 and LAN 4 LEDs (ETH2 and ETH3 on NIC card on rear of server)		
Activity LED	Solid green	The server is active and connected to the network.
	Green flashing	Indicates data activity
	Off	The port is disconnected or the Ethernet cable is not connected or linked to an active switch.
10/100/1000T LED	Solid yellow	Indicates speed at 1000T
	Amber flashing	The adapter is being identified.
Unit ID (UID) Front and Back LEDs		
Blue		Unit ID is on and identifies the unit (front and back).
Off		Unit ID has not been turned on.

Disk Drive LEDs

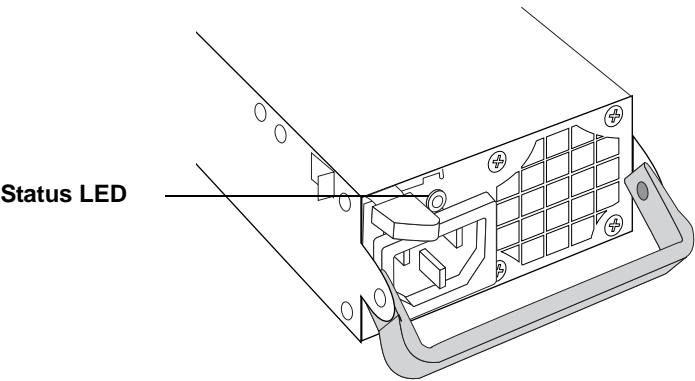
Disk drive LEDs on the Snap Server 700i Series are located beneath the status lights on the bezel. For all disk drive LEDs, the left light indicates drive status; the right light indicates drive activity. They operate as follows:

Status LED (left) Activity LED (right)		
Solid green	Off	Disk drive installed properly but is not active
Solid green	Blinking green	Disk drive installed properly and is active
Solid amber	Off	Disk drive installed, but not working correctly
Off	Off	No disk drive installed

Note You can blink a disk drive from Adaptec Storage Manager by right-clicking the drive and selecting **Blink disk drive**. See “Blinking Appliances, Enclosures, and Disk Drives” on page 109 for instructions.

Power Supply Module Indicator Lights

The LED on a 700i Series power module is identified in the following illustration.



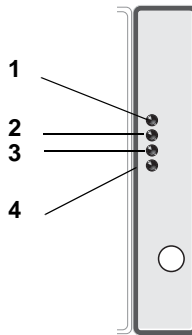
Power	Description
Solid green	The module is operating properly.
Blinking green	The module has failed or is not connected.
Solid amber	The module has failed, is not connected, or the server has been turned off.
Off	

SANbloc S50 Enclosure, Disk Drive, APC Module, and Controller Behavior

This section describes the LED indicators on the SANbloc S50 enclosure, disk drives, and APC modules.

Enclosure LEDs

On the right front of the SANbloc S50 (as shown in the following illustration) are four LEDs that indicate the status of the enclosure.

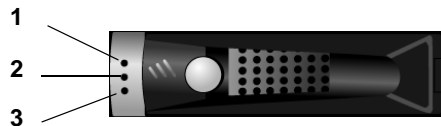


These LEDs operate as described in the following table:

LED	Condition	Indication
1	On	Enclosure power on.
2	On	Fault on enclosure. When a failure occurs on a controller or APC unit, the enclosure LEDs indicate an enclosure fault.
3	Solid green	Host Link. A solid green LED indicates communication with the server.
4		Unit ID. Currently not used.

Disk Drive LEDs

Each disk drive has three LEDs that indicate the status of the disk drive.

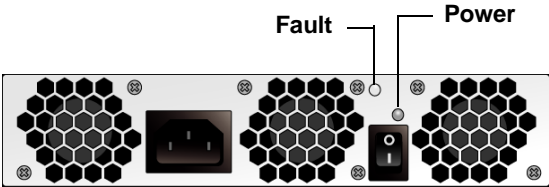


These LEDs operate as described in the following table:

LED	Condition	Indication
1	N/A	Not used.
2	Solid green	Drive present and OK.
	Solid amber	Drive failed.
	Off	Drive not present
3	Solid green	Drive present and idle.
	Green random flash	I/O activity on disk drive.
	Off	Drive not present.

APC Unit LEDs

Each APC unit has two LEDs that indicate status.



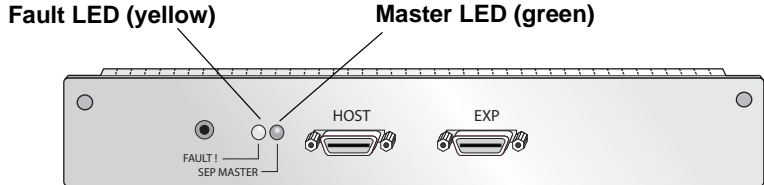
These LEDs operate as described in the following table:

LED	Condition	Indication
Power	Off	Enclosure not powered on.
	Green (solid)	APC unit functioning normally.
Fault	Off	APC unit functioning normally.
	Yellow (flash)	APC unit failure predicted.
	Yellow (solid)	APC unit failed.

When an APC unit fails, the enclosure LED on the front of the unit also indicates the failure.

Controller LEDs

The controller has two LEDs that indicate status.



These LEDs operate as described in the following table:

LED	Condition	Indication
Master	On	Controller is current Master for enclosure.
Fault	On 5-10 seconds only	Enclosure is powering on.
	On continuously	Fault condition exists on controller

Notifying Users By Email About Status and Activity

You can set up Adaptec Storage Manager to send email messages (or *notifications*) to a selected email address when an event, such as the creation of a pool or the failure of a disk drive, occurs on the iSCSI Storage Appliance. Email notifications also help you monitor these activities on your IP SAN from any location:

- Progress of scheduled jobs, such as snapshot creation
- Changes in the status of the physical components of your IP SAN, such as disk drives
- Changes to the iSCSI Storage Appliance, such as the expansion of a volume, the creation of a mirrored volume, or the creation of a hot spare

Only the email address you specify receives email notifications (see page 128). You can specify which types of events generate email messages to ensure that urgent issues receive immediate attention.

Follow the instructions in this section to:

- Set up email notifications (see page 127).
- Send a test email (see page 128).
- Modify a recipient's information or remove a recipient (see page 128).
- Modify email settings (see page 129).
- Disable email notifications (see page 129).

Setting Up Email Notifications

This section describes how to set up email notifications for one Management Service. If you have multiple Management Services on your IP SAN, you must complete the tasks in this section for each one separately.

Before you begin, note this information:

- The address of your Simple Mail Transfer Protocol (SMTP) server (host name and domain, or TCP/IP address)
- The name and email address of the person who will receive email notifications (email notifications can be sent to only one email address)

To set up email notifications:

- 1 In the Enterprise View, select the Management Service.
- 2 Click the **Configure** button, select the Management Service, then select **Email Notifications**.

The Email Notifications window opens. The SMTP Server Settings window opens if you haven't set up email notifications previously. (If you have set up email notifications previously, the SMTP Server Settings window doesn't open – skip to Step 5.)

- 3 Enter the address of your SMTP server and the "From" address to appear in email notifications. If an email recipient will be replying to email notifications, be sure that the "From" address belongs to a system that is actively monitored.
- 4 Click **Add** to save the settings.
- 5 In the Email Notifications window tool bar, click **Add email recipient**.

The Add Email Recipient window opens.

- 6 Enter the recipient's email address, select the level of events for which the recipient will receive an email, then click **Add**. (For more information on event levels, see page 119.)

The email address is added to the Email Notification Manager. (Note that the Add Email Recipient button is now greyed-out. Only one system can be in the Email Notification Manager at a time.)

- 7 Close the Email Notifications window. Continue by sending a test message, as described on page 128.

Repeat the steps in this section for each Management Service on your IP SAN.

Sending a Test Message

To ensure that an email recipient is receiving event notifications, you can send them a test message.

To send a test message:

- 1 In the Enterprise View, select the Management Service you want.
- 2 Click the **Configure** button, select the Management Service, then select **Email Notifications**.
- 3 Select the email address.
- 4 In the **Actions** menu, select **Send test message**.

The test message is sent. If the test is successful, the email recipient receives the test message. If the test fails:

- a Ensure that the recipient's email address is correct.
- b Ensure that your SMTP server address is correct.
- c Try sending the test message again.

Modifying a Recipient's Information or Removing a Recipient

This section describes how to modify a recipient's email address, change the types of event notifications that are sent, or stop sending email notifications.

To modify a recipient's information:

- 1 In the Enterprise View, select the Management Service you want.
- 2 Click the **Configure** button, select the Management Service, then select **Email Notifications**.
- 3 Select the email address.
- 4 Modify the recipient's information as required, then click **OK**.

Or,

In the tool bar, click **Delete email recipient**, then click **Yes** to confirm the deletion.

Modifications become effective immediately. If you have deleted an email recipient but you still want to be notified about status and activity by email, set up a new email recipient following the steps in "Setting Up Email Notifications" on page 127.

Modifying Email Settings

You can modify these email settings as your needs change:

- Address of your SMTP server
- ‘From’ address that will appear in email notifications

To modify email settings:

- 1 In the Enterprise View, select the Management Service you want.
- 2 Click the **Configure** button, select the Management Service, then select **Email Notifications**.
- 3 In the **Actions** menu, select **SMTP server settings**.

The SMTP Server Settings window opens.

- 4 Edit the SMTP server settings as required, then click **Add** to save the settings.

If the email recipient will be replying to email notifications, be sure that the “From” address belongs to a system that is actively monitored.

Modifications become effective immediately.

Disabling Email Notifications

Email notifications are enabled by default, but can be disabled, if required.

Note If you disable email notifications, events will be generated but email messages won’t be sent.

To disable email notifications:

- 1 Open the Email Notification Manager. (See page 127.)
- 2 In the **Actions** menu, select **Disable Email Notifications**.

Email notifications are disabled. The Email Notifications tab (shown at right) shows the red ‘disabled’ icon.



To re-enable email notifications, repeat Steps 1 and 2 of “Disabling Email Notifications”, selecting Enable Notifications during Step 2.

Notifying Users By SNMP Trap About Status and Activity

Note Before attempting the tasks in this section, you should be familiar with SNMP traps concepts and technology.

You can use Adaptec Storage Manager to monitor Simple Network Management Protocol (SNMP) traps on your iSCSI Storage Appliance, such as disk drive failures and logical device verifications. One system – typically the system where the GUI is installed – can receive SNMP trap notifications.

In the SNMP Trap Manager, you can manage the Traps List (only one system can be on the list at a time) and send test traps to the system in the Traps List.

Follow the instructions in this section to:

- Set up SNMP trap notifications (see page 130).
- Send a test trap (see page 131).
- Modify a system's information or remove a recipient (see page 131).
- Disable SNMP trap notifications (see page 131).

Setting Up SNMP Trap Notifications

Note Before attempting the tasks in this section, you should be familiar with SNMP traps concepts and technology.

To set up SNMP trap notifications:

- 1 In the Enterprise View, select the Management Service.
- 2 Click the **Configure** button, select the Management Service you want, then select **SNMP Trap Manager**. The SNMP Trap Manager opens on the SNMP Traps tab of a new window.
- 3 In the toolbar, click **Add System**.
The Add System Window opens.
- 4 Enter the host name or TCP/IP address for the system.
Adaptec recommends accepting the default trap port number, community, and version settings.
- 5 Select the event levels for which you want to receive SNMP traps. (For more information on event levels, see page 119.)
- 6 Click **Add**.
The system is added to the SNMP Traps List. (Note that the Add System button is now greyed-out. Only one system can be on the SNMP Traps List at a time.)
- 7 Close the SNMP Traps window when you're done. Continue by sending a test trap, as described on page 131.

Sending a Test Trap

To send a test trap to the system on the SNMP Traps List:

- 1 In the Enterprise View, select the Management Service.
- 2 Click the **Configure** button, select the Management Service you want, then select **SNMP Trap Manager**.
- 3 Select the TCP/IP address of the listed system.
- 4 In the **Actions** menu, select **Send test trap**.

The test trap is sent.

If the test is successful, the system receives the test message. If the test fails:

- a Ensure that the system's host name or IP address is correct.
- b Ensure that an SNMP console is running on the system, then retry the test.

Modifying a System's Information or Removing a System

If a system's information changes, or if you need to change the types of event notifications the system receives, you can update the system's information.

- 1 In the Enterprise View, select the Management Service.
- 2 Click the **Configure** button, select the Management Service you want, then select **SNMP Trap Manager**.
- 3 Select the TCP/IP address of the listed system.
- 4 In the toolbar, click **Modify System**, change the system properties as required, then click **Modify**. *Or,*

In the toolbar, click **Delete System**, then click **Yes** to confirm the deletion.

Modifications take effect immediately. If you have deleted a system but you still want to be notified about status and activity by SNMP traps, set up a new system following the steps in "Setting Up SNMP Trap Notifications" on page 130.

Disabling SNMP Traps

If you disable SNMP traps, they are generated but not sent to any system.

To disable SNMP traps:

- 1 In the Enterprise View, select the Management Service.
- 2 Click the **Configure** button, select the Management Service you want, then select **SNMP Trap Manager**.
- 3 In the **Actions** menu, select **Disable SNMP traps**.

The SNMP Trap Manager is disabled.

Monitoring Your GuardianOS-Powered Snap Servers

When you start Adaptec Storage Manager, it automatically discovers any GuardianOS-powered Snap Servers on your network and lists them under the Network Attached Storage branch of the Enterprise View. You can use Adaptec Storage Manager to view and monitor your GuardianOS-powered Snap Servers. You can also launch the GuardianOS Admin Tool from Adaptec Storage Manager, to administer individual servers.

Note To manage a *group* of GuardianOS-powered Snap Servers (to update the firmware, for instance), use the Snap Server Manager software. For more information, refer to the User CD that came with your GuardianOS-powered Snap Server. Snap Server Manager is also downloadable from the Snap Server Web site at www.snapserver.com.

Viewing Network Attached Storage Status

To check the status of all the GuardianOS-powered Snap Servers listed in Adaptec Storage Manager, click **Network Attached Storage** in the Enterprise View.

The Network Attached Storage View opens in the right panel of Adaptec Storage Manager and displays all discovered GuardianOS-powered Snap Servers. Each server's name and other details are listed, and its status is indicated in text and by color.

Enterprise view		Network Attached Storage					
iSCSI Storage							
bou2287a.adaptec.com (Managed)							
win2k3r2 (Windows 2003)							
OnTarget (Adaptec iSCSI)							
Network Attached Storage							
SNAP2250283							
SNAP2250358							
		Server	Status	IP Addr...	Model	OS Version	Disk Usage
		SNAP2250283	OK	10.20...	110	4.2.054	6% used
		SNAP2250358	OK	10.20...	210	4.2.049	11% used

What do the colors mean?


















Adaptec Storage Manager indicates server status with the same colors used in Snap Server Manager. This table describes the status levels.

Color	Description
	All status indicators are functioning properly (OK)
	One or more status indicators indicate a fault-level condition
	One or more status indicators indicate a warning-level condition
	The server is offline

In the Enterprise View, a Warning- or Error-level icon (see page 119) appears next to Network Attached Storage and any NAS server that's affected by a failure or error, creating a trail that helps you identify the source of a problem. See "Identifying Failed or Failing Components" on page 148 for more information.

What do the icons mean?

Adaptec Storage Manager uses icons to indicate which feature of a server has a specific status level. These icons turn color to indicate status, as described in the previous section.

	Icon	Description
Disk Drive Status		All disks are OK.
		A disk has failed.
		Disk status is not available (server may be offline).
Network Card Status		All Ethernet ports are OK.
		An Ethernet port has no link.
		An Ethernet port has failed, or one Ethernet port in a bonded pair has no link.
		NIC status is not available (server may be offline).
Power Supply Status		All power supplies are OK.
		A power supply is missing, has failed, or is not plugged in.
		Power supply status is not available (server may be offline).
Fan Status		All fans are OK.
		A fan is missing or has failed.
		Fan status is not available (server may be offline).
Temperature Status		System and CPU temperatures are OK.
		System and/or CPU temperatures are high.
		System and/or CPU temperatures are critical.
		Temperature status is not available (server may be offline).

Viewing GuardianOS-Powered Snap Server Properties

To view the properties of a specific GuardianOS-powered Snap Server, in the Network Attached Storage View, double-click the server, or right-click the server, then select **Properties**.

The Properties window opens. This is the same Properties window that appears for this server in Snap Server Manager.

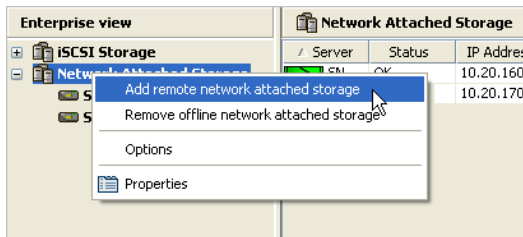
Note For more information about server properties, or to administer your GuardianOS-powered Snap Servers, use the Snap Server Manager software. For more information, refer to the User CD that came with your Snap Server. Snap Server Manager is also downloadable from the Snap Server Web site at www.snapserver.com.

Discovering New or Additional GuardianOS-Powered Snap Servers

You can add new GuardianOS-powered Snap Servers to the Network Attached Storage branch of Adaptec Storage Manager at any time, or have Adaptec Storage Manager discover all GuardianOS-powered Snap Servers on a different subnet.

To discover new or additional servers:

- 1 In the Enterprise View, right-click **Network Attached Storage**, then click **Add remote network attached storage**.



The Remote Servers window opens.

- 2 Ensure that there's a checkmark in the box beside **Enable discovery of remote servers**.
- 3 Enter the IP address or name of a server, then click **Add**.

The server is added to the list of Remote Servers.

Alternatively, you can import a list of servers instead of adding them individually. Click **Import**, browse to the list file (a text file), then click **Open**.

- 4 Repeat Step 3 until all new servers have been added.

Note A newly discovered server recognizes all the GuardianOS-powered Snap Servers on its subnet. Save time by adding only one new server from a new subnet; Adaptec Storage Manager will automatically discover the rest.

- 5 Click **OK**.

The new servers and any other GuardianOS-powered Snap Servers discovered on the same subnets are added to Adaptec Storage Manager.

Removing Offline Servers from Adaptec Storage Manager

To make monitoring easier, you can remove all offline GuardianOS-powered Snap Servers from Adaptec Storage Manager.

Note You can't specify which individual servers to remove from Adaptec Storage Manager; all offline GuardianOS-powered Snap Servers are removed.

To remove offline servers:

- 1 In the Enterprise View, right-click **Network Attached Storage**, then click **Remove offline network attached storage**.
- 2 Click **OK** to confirm.

All offline GuardianOS-powered Snap Servers are removed from Adaptec Storage Manager.

Disabling Remote Discovery of GuardianOS-Powered Snap Servers

You can choose to remove from Adaptec Storage Manager all GuardianOS-powered Snap Servers that are on remote subnets by disabling remote discovery. You might want to do this if there are too many servers in the view to monitor easily, or if you want to monitor only the servers on the local subnet.

To disable remote discovery:

- 1 In the Enterprise View, right-click **Network Attached Storage**, then click **Add remote network attached storage**.

The Remote Servers window opens.

- 2 Deselect **Enable discovery at remote servers**, then click **OK**.

Remote discovery is disabled. All GuardianOS-powered Snap Servers on remote subnets appear offline in Adaptec Storage Manager. (This may take a few minutes.)

Enterprise view

iscsi Storage

bou2287a.adaptec.com (Man...

Network Attached Storage

DanB-18k

ds9

PUB5303030

PUB54500

SNAP2250283

SNAP2250358

ssg

Network Attached Storage

Server	Status	IP Address	Model	OS Version	Disk Usage
Da...	Offline	192.168....	18000	4.4.033	?
ds9	Offline	172.21.1....	4500	4.1.2.0o...	?
PU...	Offline	192.168....	4400	4.4.023	?
PU...	Offline	192.168....	4500	4.4.001	?
SN...	OK	10.20.16...	110	4.2.054	6% ...
SN...	OK	10.20.17...	210	4.2.049	11% ...
ssg	Offline	192.168....	410	4.2.054	?

A white status icon indicates an offline server

- 3 To remove offline GuardianOS-powered Snap Servers from Adaptec Storage Manager, see page 135.

Opening the GuardianOS Administration Tool

You can view and modify the GuardianOS by launching the Web-based Administration Tool from Adaptec Storage Manager.

To open the GuardianOS Administration Tool, in the Enterprise View, right-click the server you want, then select **Administer this server**. (You can also access the Administration Tool by right-clicking the server in the Network Attached Storage View and selecting **Administer this server**.)

The GuardianOS Administration Tool opens. For more information about the GuardianOS, and for instructions on using the Administration Tool, refer to the *Snap Server Administrator Guide* on the User CD or the Administration Tool online Help.

Changing the Network Attached Storage Management Settings

You can change these Network Attached Storage management settings to suit your requirements:

- Specify the Web browser for the Administration Tool (see page 137)
- Set the period after which a server is considered offline (see page 137)
- Specify whether Adaptec Storage Manager displays a warning if any server's Ethernet ports have no link (see page 137)
- Instruct Adaptec Storage Manager to directly scan all servers (see page 138)
- Configure an HTTP proxy server for online registration (see page 138)

To change the settings, in the Enterprise View, right-click **Network Attached Storage**, then click **Options**. The Options window opens. Follow the instructions in this section to adjust the settings.

Note For more information about server management, or to administer your GuardianOS-powered Snap Servers, use the Snap Server Manager software. For more information, refer to the User CD that came with your Snap Server. Snap Server Manager is also downloadable from the Snap Server Web site at www.snapserver.com.

Specifying a Web Browser:

To specify the Web browser that's used to display the Administration Tool:

- 1 Click **Browse**, then navigate to the executable file (.exe) for the browser you want, then click **Open**.
- 2 Click **Test** to ensure that the Administration Tool opens properly.

If the test is successful, the browser you specified opens and displays a 'test successful' message.

Adjusting the Server Offline Time-out Setting

Adaptec Storage Manager constantly updates the list of GuardianOS-powered Snap Servers in the Network Attached Storage branch with fresh data it receives from servers that are on the local network segment and specified on the Remote Servers list.

Adaptec Storage Manager considers a server offline if no communication occurs for the specified time-out period. (The default time-out period is 180 seconds.) If Adaptec Storage Manager receives no communication from any server for 180 seconds, it displays that server as offline in the Network Attached Storage View.

Adjust the time-out interval to a setting between 120 seconds and 300 seconds to suit your requirements, then click **OK**.

Displaying No-Link Status Warnings

By default, Adaptec Storage Manager displays a warning status if one of a server's Ethernet ports has no link. You can disable the no-link status feature if your IP SAN doesn't include any servers with only one active Ethernet port.

To disable the no-link status feature, uncheck the **Display warning if...** check box, then click **OK**.

Activating Autoscanning of All Remote GuardianOS-Powered Snap Servers

When Adaptec Storage Manager is installed on a laptop that is moved from one network segment to another, some remote servers may appear to be offline when they are in fact online. To ensure that discovery of remote servers works properly, check the **Autoscan servers...** checkbox, then click **OK**.

Note Activating this feature increases network traffic.

Using an HTTP Proxy Server

In environments that use an HTTP proxy server for external Web-based communication, Adaptec Storage Manager must be configured to use the proxy for online server registration.

To use an HTTP proxy server:

- 1 Select the **Use a proxy server...** checkbox.
- 2 Enter the name or IP address of the proxy server.
- 3 Enter the port used by the proxy server.
- 4 Click **OK**.

Updating and Customizing Adaptec Storage Manager

This chapter explains how to customize Adaptec Storage Manager as your requirements change and update it as new versions become available.

Updating Adaptec Storage Manager

When newer versions of Adaptec Storage Manager become available, you can update your IP SAN, if required.

Newer versions of Adaptec Storage Manager can be downloaded from the Adaptec Web site at www.adaptec.com.

If a newer version of Adaptec Storage Manager includes features that are incompatible with an earlier version and therefore isn't "downgradeable" after installation, you will be notified by Adaptec Storage Manager before the installation begins.

Note If a previous version of Adaptec Storage Manager is installed on your system, you must remove it before installing a new version.

Customizing Adaptec Storage Manager

Change display settings, and add or remove features from the Adaptec Storage Manager main window to make managing your IP SAN easier and more effective.

Note The tasks described in this section are optional.

You can customize Adaptec Storage Manager by:

- Sorting the systems in the Enterprise View (see page 140).
- Selecting the standard unit of measure shown for disk drives (see page 140).
- Excluding the tool bar or status bar from the main window, or turning off the Tool Tips (see page 141).

Sorting Systems in the Enterprise View

You can choose the order in which components appear in the Enterprise View. You can select the order in which the branches are displayed, and you can choose to have all components listed either alphabetically (by name) or chronologically (by the date on which they were added to Adaptec Storage Manager).

You might want to do this to make it easier to monitor your network or find a particular component in the Enterprise View.

By default, the branches appear in this order when you install Adaptec Storage Manager for iSCSI Storage:

- The iSCSI Storage branch
- The Direct Attached Storage branch (if the local system contains Adaptec direct attached storage)
- The Network Attached Storage branch (if your network includes GuardianOS-powered Snap Servers)

Also by default, components of the Enterprise View are listed in alphabetical order.

To change how components are ordered in the Enterprise View:

- 1 In the **File** menu, select **Preferences**.
- 2 Click the **Display options** tab.
- 3 In the **System tree orientation** drop-down menu, select the Enterprise View branch that you want to appear first. (Options available in the menu depend on what type of storage is included in your network.)
- 4 In the **System tree sorting** drop-down menu, select either **Alphabetical** or **Chronological**.
- 5 Click **OK**.

The Enterprise View is updated.

Note You can also select which branches of the Enterprise View appear or don't appear. See page 52 for more information.

Setting the Standard Unit of Measure

You can set Adaptec Storage Manager to show disk drive capacity in measures of megabytes (MB), gigabytes (GB), or terabytes (TB). You can also choose the Auto-select setting to allow Adaptec Storage Manager to show the most appropriate unit of measure based on disk drive size. The Auto-select option allows different disk drives to be shown in different units of measure.

By default, disk drives are shown in GB.

To change the standard unit of measure:

- 1 In the **File** menu, select **Preferences**.
- 2 Click the **Display options** tab.
- 3 In the **Capacity display units** drop-down menu, select the option you want.
- 4 Click **OK**.

The display units in Adaptec Storage Manager are updated.

Changing the Main Window Appearance

You can choose to remove the tool bar and status bar from the main Adaptec Storage Manager window to save space on-screen. You can also choose to turn off the Tool Tips that automatically appear when you place your cursor over on-screen items.

You can choose which branches of the Enterprise View appear or don't appear. You might want to do this if you are focusing on one branch in particular, or if your network no longer includes a particular type of storage.

To change the appearance of the main window, use the **View** menu options; these options are toggle switches, which means that they can be selected and deselected by clicking on them.

Creating and Working with Display Groups

You can organize related Management Services into display groups to make managing your IP SAN easier and more effective.

Management Services (and their associated iSCSI Storage Appliances and iSCSI Storage Hosts) in a display group appear together in the Enterprise View under the group name. A Management Service can belong to only one display group at a time; you can't include the same Management Service in multiple display groups.

Display groups are sorted alphabetically and appear in the Enterprise View below any Management Services that are not part of a display group.

To create a display group:

- 1 In the Enterprise View, right-click on a Management Service that you want to add to a display group.
- 2 In the **Actions** menu, select **Change display group**, then click **New group**.

- 3 Enter a name for the new display group, then click **OK**.

The display group is created and the system you selected in Step 1 is added to it.

- 4 To add another Management Service to the display group, select the Management Service in the Enterprise View, in the **Actions** menu select **Change display group**, then click the display group name.

The Management Service is added to the display group.

Adding a System to a Display Group

As your IP SAN grows and changes, you can add new systems to your display groups.

Note A system can belong to only one display group at a time; you can't include the same system in multiple display groups.

To add a system to a display group:

- 1 Right-click on the system in the Enterprise View.
- 2 Select **Change display group**, then click the display group name.

The system is added to the display group.

Viewing Display Group Status

To quickly view the status of Management Services within a display group, you can open the display group Properties window.

To view display group status:

- 1 In the Enterprise View, select the display group name
- 2 In the **Actions** menu, click **Properties**.

The Properties window opens for that display group, summarizing the status of the Management Services that belong to that group.

Modifying Display Groups

You can rename a display group, move a Management Service from one display group to another, remove a Management Service from a display group, and delete an entire display group, using the Action menu options for the display group and Management Services.

Any changes made to display groups affect the display groups only, not the Management Services, iSCSI Storage Appliances, and iSCSI Storage Hosts included in them.

Solving Problems

This chapter provides tips to help you resolve problems on your iSCSI Storage Appliance using Adaptec Storage Manager.

General Troubleshooting Tips

If you experience problems installing or using Adaptec Storage Manager, follow these suggestions:

- Ensure that Adaptec Storage Manager is properly installed on the management system.
- Ensure that no one is running Adaptec Storage Manager remotely on the management system. (Adaptec Storage Manager will only open once on a system.)
- Ensure that an iSCSI initiator is properly installed on each system. (The Windows Support components of Adaptec Storage Manager can't be installed on a system until an iSCSI initiator is installed.)

If the system is running Windows 2003, ensure that the Microsoft Software Initiator is installed, even if a hardware iSCSI initiator is also installed.

- Ensure that all iSCSI Storage Hosts are powered on and that they have the Windows Support components of Adaptec Storage Manager installed on them. (See page 17 for more information.)
- Ensure that the system on which you're running the Adaptec Storage Manager GUI supports 256 color video mode.
- Ensure that you have correctly set the IP addresses of the data ports on your iSCSI Storage Appliance (see page 36).
- Ensure that you have logged into the Management Service as an Administrator.
- Check all cable connections.
- Try uninstalling and reinstalling Adaptec Storage Manager.

Caution To avoid permanent data loss, *do not* modify the default BIOS settings of the RAID controller. To safely configure or modify the iSCSI Storage Appliance, use either Adaptec Storage Manager or the CLI only.

You can track IP SAN activity by viewing the log files generated automatically by Adaptec Storage Manager. These files are located in the directory where Adaptec Storage Manager is installed:

- **RaidEvt.log** – Information reported in the Event Viewer for all systems.
- **RaidEvtA.log** – Information reported in the Event Viewer for the local system.
- **RaidErr.log** – Java messages generated by Adaptec Storage Manager.
- **RaidErrA.log** – Java messages generated by the Adaptec Storage Manager Agent.

Note Log files have a maximum size. When they reach their size limit, the information is moved to a new file with a .1 extension, which itself is deleted eventually as newer log files are created.

Troubleshooting Questions and Answers

Adaptec Storage Manager is installed properly. Why won't it open?

Adaptec Storage Manager won't start on a system that uses only 16 colors. To successfully run Adaptec Storage Manager, your system must support 256 color video mode.

Why am I prompted for a password when I add an iSCSI Storage Appliance to the Management Service?

You may be prompted for a password if the iSCSI Storage Appliance you are adding was added to another Management Service previously. Enter the CLI Administrative password for that iSCSI Storage Appliance. The default password is admin.

Why can't I add an iSCSI Storage Host to a Management Service?

If you cannot log in to an iSCSI Storage Host, ensure that:

- The iSCSI Storage Host isn't already being managed by another Management Service.
- You entered the correct host name or data port IP address.
- The system is powered on.
- A compatible version of Adaptec Storage Manager is installed on the system.
- The Windows Support components of Adaptec Storage Manager are installed on the system (see page 17).
- The system is on the same network (or subnet) as the iSCSI Storage Appliance.
- The system is running on the correct port.
- The Management Service is started in the Microsoft Services file.

Why am I prompted for a user name and password when I add an iSCSI Storage Host to a Management Service?

One reason you may be prompted for a user name and password is if the iSCSI Storage Host you are adding was added to another Management Service previously. Enter the Windows user name and Administrative password for that iSCSI Storage Host.

Why are some of my pools greyed-out in Adaptec Storage Manager?

- If you have transferred a disk drive that was used for direct attached storage to your iSCSI Storage Appliance, any arrays that were stored on that disk drive will appear as *alien pools*.

In Adaptec Storage Manager, alien pools are greyed-out in the Logical Devices View and can't be used to store data. Delete these alien pools from Adaptec Storage Manager. See "Deleting an Individual Pool" on page 101 or "Deleting All Pools" on page 101 for instructions.

- If you update your iSCSI Storage Appliance to a new image of the operating system (see page 111), then delete a pool, that pool will appear offline if you then revert to the previous image of the operating system. You can't delete an offline pool from Adaptec Storage Manager.

Why did my volume creation/reassign job fail or seem to fail?

Currently, volume creation jobs may fail or appear to fail if they are started during a period of heavy I/O activity while your iSCSI Storage Appliance is also in the process of creating or rebuilding a pool. To resolve the problem, wait to create a volume until pool creation is complete or I/O activity has decreased.

A volume creation or reassign job will fail if its selected mount point is already in use.

Why can't I connect to a newly imported pool?

If authentication is set on a pool which is exported from one iSCSI Storage Appliance and imported to another, you must reset authentication on the pool once it's imported. Why did my recurring snapshot job fail?

If you set up a recurring job that creates and mounts a snapshot on the same disk drive, you must free the disk drive after each job or the job will fail.

Why did all the snapshots in my pool suddenly go offline?

Currently, when a pool reaches maximum capacity, all snapshots contained within it go offline. For more information, see “Volume snapshots are snapshots of a file or directory on a specific volume, taken at any time.” on page 69.

Always carefully monitor the capacity of any pool that contains snapshots to avoid a lengthy recovery process or possible snapshot loss. To recover from a pool capacity failure, see “Recovering Snapshots After a Pool Capacity Failure” on page 154.

How do I recover storage space from a mirror plex that’s gone offline?

If a mirror plex becomes unavailable (due to a power failure or a failed disk drive, for instance), you must first permanently disassociate it from the mirror manager (see page 77), then delete the underlying logical device to recover the storage space (see page 105).

Why aren’t email notifications being received properly?

If the system designated to receive email notifications is not receiving them:

- Ensure that the recipient’s email address is correct. (See “Modifying a Recipient’s Information or Removing a Recipient” on page 128 to modify the address.)
- Ensure that your SMTP server address is correct. (See “Modifying Email Settings” on page 129 to modify the address.)

Send a test email to ensure that the problem is solved. (See page 128.)

Why am I getting an error message that says ‘N-way mirroring not supported’?

If you change the IP address of an iSCSI Storage Appliance used in a mirror, this message may appear when you try to create a mirror on that appliance. Use the CLI to update the IP address in the controller list for each mirror partner. If the iSCSI Storage Appliance is no longer used in a mirror, delete the IP address entry from the controller list.

How can I stop Adaptec Storage Manager from generating ‘Terminating connection’ messages about my VMware systems?

To stop receiving ‘Terminating connection’ messages from the VMware systems accessing storage on your iSCSI Storage Appliance, enable the VMware iSCSI initiators’ “Uses permanent discovery session” option (in the initiators’ Advanced settings).

Why did all the other disk drives in my pool disappear when I only removed one disk drive?

If your IP SAN includes multiple iSCSI Storage Appliances, all remaining disk drives in a pool may disappear from the Adaptec Storage Manager GUI and the CLI device list if you remove a disk drive from the pool. Refresh the GUI and the CLI device list by shutting down and restarting the iSCSI Storage Appliance.

Why don't the configuration changes I made using the CLI appear in Adaptec Storage Manager?

If you are using the CLI and Adaptec Storage Manager concurrently, changes made in the CLI may not appear in the Adaptec Storage Manager GUI immediately. Press **F5** to refresh the window.

Why can't my system connect to the VDS Provider?

At this time, Adaptec Storage Manager does not support Internet Protocol Version 6 (IPv6).

Follow the instructions for your OS to work around this issue:

- For Windows XP (Service Packs installed) or Windows Server 2003, see
- For Windows XP (No Service Pack Installed)

Windows XP (Service Packs Installed) or Windows Server 2003

- 1 Log on to the system with a user account that has privileges to change network configuration.
- 2 In the **Control Panel**, double-click **Network Connections**.
- 3 Right-click any local area connection, and then click **Properties**.
- 4 Select **Microsoft TCP/IP version 6** (*Windows XP with SP2 or Windows Server 2003*).
or
Select **Microsoft IPv6 Developer Edition** (*Windows XP with SP1*).
- 5 Click **Uninstall**.
- 6 When prompted to confirm the removal of the Microsoft IPv6 Developer Edition or Microsoft TCP/IP version 6 protocol, click **OK**.

Windows XP (No Service Pack Installed)

- 1 Log on to the system with a user account that has local administrator privileges.
- 2 From the desktop, click **Start**, point to **Programs**, point to **Accessories**, and then click **Command Prompt**.
- 3 At the command prompt, enter:

```
ipv6 uninstall
```

How do I create a support archive file?

Your Adaptec Storage Manager service representative might ask you to create a configuration and status information archive file to help diagnose a problem with your system.

To create the archive file:

- 1 In the Enterprise View, select the iSCSI Storage Appliance on which the problem is occurring.
- 2 In the **Actions** menu, select **Save support archive**.
- 3 Enter a name for the archive file or accept the default name, then click **Save**.

Silencing an Alarm

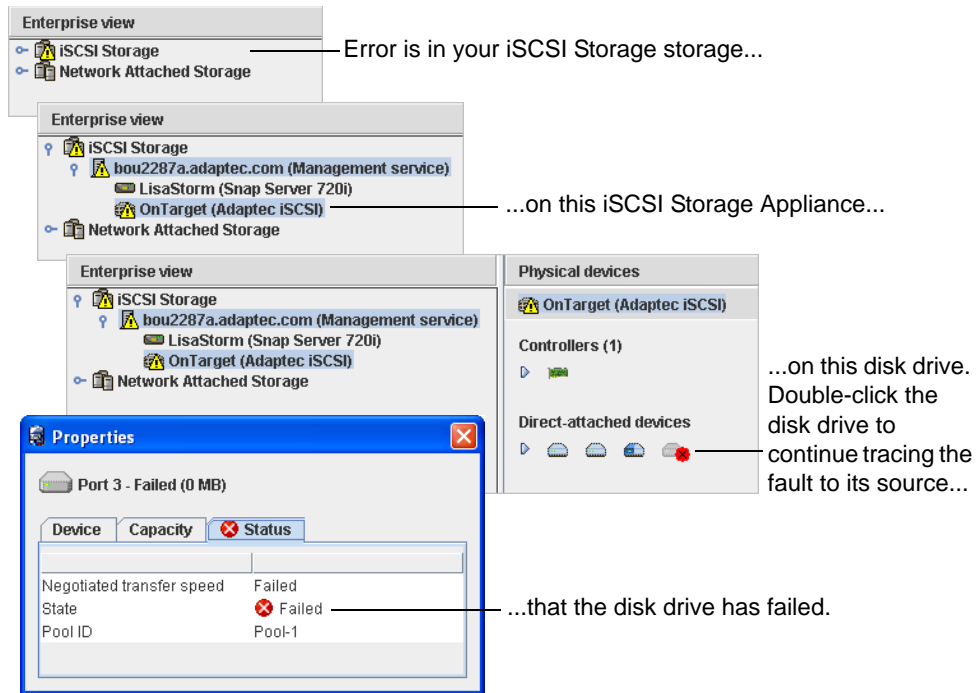
At this time, the Silence button in Adaptec Storage Manager will not silence an alarm on iSCSI storage devices or JBODs. If an alarm sounds, you must silence it at the device level (for instance, by pressing the Mute button on the back of the JBOD), or use the CLI to enter a silence command (see page 179).

Identifying Failed or Failing Components

When you are notified of a Warning- or Error-level event, use Adaptec Storage Manager's rapid fault isolation feature to quickly identify the source of the problem.

For instance, in this example, an iSCSI Storage Appliance has stopped responding. To find the source of the problem, follow the yellow Error and red Warning icons, as shown in the example on page 149.

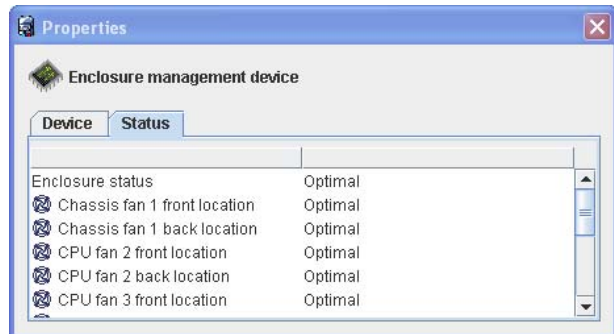
Once the source of a problem has been identified, you can blink the associated hardware component (if applicable) to find its physical location. See page 109.



Note At any time, you can open the Properties window of a component by double-clicking the component in the right panel of Adaptec Storage Manager.

Identifying Which Fan has Failed

If the fan icon shows a failed fan, you can determine which fan failed by selecting the affected server in the Enterprise View, then double-clicking the Enclosure Management Device icon to open the Properties window for the server. Click the **Status** tab, then scroll through the list of enclosure components. A yellow or red exclamation point will appear next to the problem component.



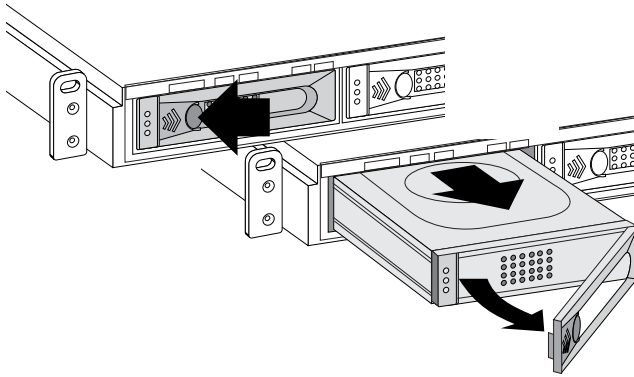
Hot Swapping Disk Drives

The term *hot swap* refers to the ability to remove and add components to a system without the need to turn off the server or interrupt client access.

Caution Do not hot swap a disk drive that is part of a pool, volume, or logical device. You may lose data and pool configuration information if you do.

You can hot swap disk drives on a Snap Server 700i Series or SANbloc S50 RAID 1, 5, 6, 10, 50, 60, or 1E by following the basic steps outlined next:

- 1 Remove the front bezel by pressing in the latches on each side of the bezel and pulling the bezel away from the chassis (700i Series only).
- 2 On the closed handle of the failed disk drive, press the button in and to the left to release the latch.



- 3 Open the handle and pull to remove the drive from the chassis.
- 4 Release the latch on the new drive and open its handle. If the handle is closed, you cannot insert the disk drive completely into the bay.
- 5 Insert the new disk drive, making sure you push it forward until it is firmly seated and the handle begins to swing closed. Then close the handle until it clicks into place to completely seat the drive to its connection.

Note Be sure to push firmly on the drive to securely seat it in the drive bay before you close the handle. You should hear a click to indicate the drive has been inserted as far as it can go.

- 6 Replace the front bezel (700i Series only).

Recovering from a Disk Drive Failure

When a disk drive fails for any reason, it is represented in Adaptec Storage Manager with a red X, as shown at right.



This section explains how to recover when a disk drive fails:

- If the pool was protected by a hot spare (see the next section).
- If the pool was *not* protected by a hot spare (see page 151).
- If there is a disk drive failure in more than one pool simultaneously (see page 151).
- If it is a RAID 0 pool (see page 152).
- If multiple disk drives fail within the same pool (see page 152).

Failed Disk Drive Protected by a Hot Spare

When a pool is protected by a hot spare, if a disk drive in that pool fails the hot spare is automatically incorporated into the pool and takes over for the failed drive.

For instance, when a disk drive fails in a RAID 5 pool, the pool is automatically *rebuilt* (its data is reconstructed) using the hot spare in place of the failed drive. You can't access the pool until the rebuilding is complete.

Note In Adaptec Storage Manager, the color of the hot spare changes from light-blue to dark-blue, showing that it is now part of a pool.

To recover from the failure:

- 1 Remove and replace the failed disk drive (following the instructions in "Hot Swapping Disk Drives" on page 150).
- 2 Designate a new hot spare to protect the pools on that iSCSI Storage Appliance.

Failed Disk Drive *Not* Protected by a Hot Spare

When a pool is not protected by a hot spare, if a disk drive in that pool fails, remove and replace the failed disk drive. The controller detects the new disk drive and begins to rebuild the pool.

For instance, when one of the disk drives fails in a RAID 1 pool, the pool is *not* automatically rebuilt. The failed disk drive must be removed and replaced before the pool can be rebuilt.

If the controller fails to rebuild the pool, check that the cables, disk drives, and controllers are properly installed and connected.

Failure in Multiple Pools Simultaneously

If there's a disk drive failure in more than one pool at the same time (one failure per pool), and the pools have hot spares protecting them, the controller rebuilds the pools with these limitations:

- A hot spare must be of equal or greater size than the failed disk drive it's replacing.

- Failed disk drives are replaced with hot spares in the order in which they failed. (The pool that includes the disk drive that failed first is rebuilt first, assuming an appropriate hot spare is available—see the previous bullet.)

If there are more disk drive failures than hot spares, see “Failed Disk Drive Not Protected by a Hot Spare” on page 151.

Disk Drive Failure in a RAID 0 Pool

Because RAID 0 volumes do not include redundancy, if a disk drive fails in a RAID 0 pool, the data can’t be recovered.

Correct the cause of the failure or replace the failed disk drives. Then, restore your data (if available).

Multiple Failures in the Same Pool

Except in RAID 6 pools, if more than one disk drive fails at the same time in the same pool, the data can’t be recovered.

Correct the cause of the failure or replace the failed disk drives. Then, restore your data (if available).

Note In some instances, RAID 10 and RAID 50 pools *may* survive multiple disk drive failures, depending on which disk drives fail.

Removing a Failed Disk Drive’s Icon from Adaptec Storage Manager

Note You can only complete this task on disk drives that are not included in any pool.

When a disk drive fails, it may still appear in Adaptec Storage Manager although it is no longer available. To see an accurate representation of your IP SAN and make it easier to monitor your disk drives, you can remove a failed disk drive from the Physical Devices View.

In the Physical Devices View, right-click the failed disk drive, then select **Remove failed drive**.

Rebuilding Pools

A *hot-swap rebuild* occurs when a controller detects that a failed disk drive in a pool has been removed and then reinserted.

To start a hot-swap rebuild:

- 1 Following the instructions in “Hot Swapping Disk Drives” on page 150, gently pull the failed disk drive from the server without fully removing it, then wait for it to spin down fully before continuing.
- 2 If nothing is wrong with the disk drive, reinstall it.
If necessary, replace the failed disk drive with a new disk drive of equal or larger size.
- 3 The controller detects the reinserted (or new) disk drive and begins to rebuild the pool.

Recovering Snapshots After a Pool Capacity Failure

If pool capacity becomes exhausted, all snapshots within that pool (and all the volumes on which the snapshots are based) go offline, and Adaptec Storage Manager generates a failure message.

When a pool capacity failure happens, the write that exhausted the pool's capacity is failed back to the iSCSI initiator that wrote it.

Note For more information, see “Volume snapshots are snapshots of a file or directory on a specific volume, taken at any time.” on page 69.

If you receive a failure message, follow these steps to recover your snapshots:

- 1 Recover or create available space in the pool:
 - Delete unneeded volumes from the pool (see page 101).
 - Add storage capacity to the pool (see page 96).
 - Delete all the snapshot sets associated with the volume (see page 66).
- 2 In the Snapshots View, select an offline snapshot to highlight its snapshot parent, then select the snapshot parent.
- 3 In the **Actions** menu, select **Set snapshot group online**.

Note If the Set snapshot group online menu option is greyed-out, recover or create more space in the pool, following the suggestions in Step 1.

- 4 Click **Yes** to confirm.

The snapshots are recovered.

Using the Reset Button to Perform a Limited Reset of the Appliance

The Reset button is accessed via a small hole next to the Power button on the front of the server. Verify that the server is fully booted (as indicated by the System LED blinking once per second), and push the **Reset** button. The system will reboot after about a minute. As a part of the reset and reboot process, the Snap Server 700i Series:

- Clears user-defined settings such as DHCP configuration
- Resets the server name to its default setting (SNAP<server number>)
- Resets network speed and bonding settings to their defaults
- Resets the Administrator password to the default (admin)
- Resets the Operator password to the default (admin)

Recovering from an iSCSI Storage Appliance Failure

These instructions describe how to recover from the failure of an iSCSI Storage Appliance.

Note If you are recovering from an appliance failure in a mirrored environment, see page 159.

1 Shut down the appliance.

- a In the Enterprise View, select the iSCSI Storage Appliance.
- b From the **Actions** menu, select **Shut down iSCSI storage appliance**.
- c Click **Yes** to shut down the appliance.

2 Replace the iSCSI Storage Appliance.

Remove the disk drives from the failed appliance and reinstall them in the new one, following the instructions in “Hot Swapping Disk Drives” on page 150.

Note The disk drives don’t have to remain in the same order.

3 Configure the iSCSI Storage Appliance.

Note When configuring your iSCSI Storage Appliance, use settings that are identical to the previous configuration, if possible. Using identical settings increases the likelihood that the iSCSI initiators on your IP SAN will automatically discover and reconnect to existing iSCSI targets.

- a In the Enterprise View, select the iSCSI Storage Appliance.
- b In the **Actions** menu, select **Configure iSCSI storage appliance**.

The wizard opens to the Configure iSCSI Storage Appliance step.

- c Enter the settings for your iSCSI Storage Appliance when prompted. If possible, use the *exact* same values as the previous configuration.

If you don’t have a record of the previous configuration settings (recorded at initial setup), enter values as if you are configuring a new iSCSI Storage Appliance.

- d Click **Apply**, then click **Cancel** to close the wizard.

4 Reconnect with the iSCSI Storage Appliance.

- a In the Enterprise View, select the Management Service to which your iSCSI Storage Appliance was associated.
- b If the Management Service automatically reconnects to the iSCSI Storage Appliance, skip to Step g.

If the Management Service can’t automatically reconnect to the iSCSI Storage Appliance, you must remove that appliance from the Management Service then add it back in.

- c Right-click the Management Service, select **Remove**, then select the name of the iSCSI Storage Appliance.
- d Right-click the Management Service, then select **Add iSCSI storage appliance**.
The Add iSCSI Storage Appliance dialog box opens.
- e Enter the IP address of the iSCSI Storage Appliance, then click **Add**.
- f If prompted, enter the administrator password you set while configuring your iSCSI Storage Appliance, but *don't* enter a user name.
The iSCSI Storage Appliance appears in the Enterprise View, under the Management Service.
- g If your iSCSI targets come back online, the recovery is complete.
If you used new settings while configuring your iSCSI Storage Appliance, or if you used settings that were identical to the previous configuration but your iSCSI targets failed to come back online, continue with Step 5.

5 Reconnect your iSCSI initiators and iSCSI targets.

Follow the instructions in this section if you used new settings while configuring your iSCSI Storage Appliance, or if you used settings that were identical to the previous configuration but your iSCSI targets failed to come back online. You must complete the tasks in this section for each system on your IP SAN:

- For iSCSI Storage Hosts, see the next section.
- For systems running Windows XP, Linux, or VMware, see page 159.

Recovery on iSCSI Storage Hosts

Follow the steps in this section to reconnect each iSCSI Storage Host in your IPSAN.

Enabling Authentication

If any of the iSCSI targets (logical devices) on your iSCSI Storage Appliance have CHAP enabled, complete this task. Otherwise, skip to “Removing iSCSI Targets and Adding the Appliance IP Address” on page 157.

- 1 In the Logical Devices View, right the words ‘**Logical devices**’, then click **Modify logical devices**.

The wizard opens to the Define Logical Devices screen.

- 2 Click **Set CHAP Secret**.

- 3 In the Global User Name and Password Management window, enter a user name and password for a user that will have access to the logical device, then click **Add**.

- 4 Continue adding user names and passwords until all users are included on the list.

Note The user list must have at least one name on it.

- 5 Click **Cancel** to close the window.
- 6 Repeat Step 2 to 5 for each logical device with CHAP authentication.
- 7 Click **Next**, then click **Next** again.
- 8 Click **Apply**, then click **Yes**.

Removing iSCSI Targets and Adding the Appliance IP Address

- 1 On the iSCSI Storage Host, go to the **Start** menu and open **Microsoft iSCSI Initiator**.

The iSCSI Initiator Properties window opens.

- 2 Click the **Targets** tab, then log off any iSCSI target whose status is 'Reconnecting'.
- 3 Click the **Persistent Targets** tab, then remove any iSCSI target whose status is 'Inactive'.
- 4 Click the **Discovery** tab.
- 5 From the list of IP addresses, remove any address that does not belong to the iSCSI Storage Appliance.
- 6 Click **Add**.
- 7 Enter the IP address for the iSCSI data port on your iSCSI Storage Appliance (as set in "Step 2: Configuring the iSCSI Storage Appliance" on page 36), then click **OK**.

If your iSCSI Storage Appliance has two iSCSI data ports, repeat this step for the other port.

Logging into the iSCSI Targets

- 1 In the iSCSI Initiator Properties program, click the **Targets** tab.
- 2 Select an iSCSI target, then click **Log On....**
- 3 Select **Automatically restore this connection....**

If CHAP is enabled on this iSCSI target, click **Advanced**, select **CHAP logon information**, enter the user name and password ('target secret') for that iSCSI target, then click **OK**.

Note The target secret is the password you set in "Removing iSCSI Targets and Adding the Appliance IP Address" on page 157.

- 4 Click **OK** to log on to the iSCSI target.

Reconnecting Mirrored Volumes

Before you begin, ensure that you are connected to each iSCSI Storage Appliance that hosts the mirrored volumes, using either a monitor and keyboard or a serial cable connected to a system running a terminal emulation program.

Note In these steps, the iSCSI Storage Appliance with the replaced flash drive is called Appliance A; the iSCSI Storage Appliance that contains the mirrored volumes is called Appliance B.

- 1 Use Appliance B's CLI to ensure that Appliance B is logged in to Appliance A.
If Appliance A does not have a new IP address, skip to Step d below.
If Appliance A has a new IP address:
 - a Type controller manage *Appliance_A* ip remove *oldIPaddress*, then press **Enter**.
 - b Type controller manage *Appliance_A* ip add *newIPaddress*, then press **Enter**.
 - c Appliance B logs in to Appliance A. (This may take a few moments.)
 - d Type controller list, then press **Enter**.
Confirm that Appliance A's controller is listed.
- 2 Use Appliance A's CLI to reconnect Appliance A to Appliance B.
 - a Type controller discover *IPaddress_of_applianceB*, then press **Enter**.
 - b Type controller add *IPaddress_of_applianceB*, then press **Enter**.
 - c Type controller list, then press **Enter**. Confirm that Appliance B's controller is listed.
- 3 Use Appliance A's CLI to update the IP addresses of remote plexes in Appliance A's mirrors.
 - a Type mirror manage m1 plex 0/1 *IPaddress_of_ApplianceB_iSCSI_interface*, then press **Enter**.
 - b Repeat Step 1 for each mirror.
- 4 Use Appliance B's CLI to update the IP addresses of remote plexes in Appliance B's mirrors.
 - a Type mirror manage m1 plex 0/1 *IPaddress_of_ApplianceA_iSCSI_interface*, then press **Enter**.
 - b Repeat Step 1 for each mirror.

Last Step

In the View menu, select **Refresh**. All iSCSI Storage Appliances, iSCSI targets, and mirrored volumes should appear online, connected, and in normal status. The recovery of each iSCSI Storage Host is complete.

Recovery on Systems Running Windows XP, Linux, or VMware

This section provides a general overview of the steps required to reconnect to each system in your IPSAN that's running an OS besides Windows 2003 or Windows Vista. For specific instructions, refer to the documentation provided with your iSCSI initiators.

- 1 Remove all iSCSI target sessions from the iSCSI initiator.
- 2 Remove all iSCSI Storage Appliance data ports from the iSCSI initiator.
- 3 Add the IP address(es) of the data port(s) on your iSCSI Storage Appliance.
- 4 Your iSCSI initiator may automatically discover the iSCSI targets on your iSCSI Storage Appliance. If not, manually add the iSCSI targets to the iSCSI initiator.

The recovery of each system is complete.

Recovering from a Flash Drive Failure in a Mirrored Environment

Follow the instructions in this section if a flash drive fails in an iSCSI Storage Appliance that is part of a mirror.

- 1 Complete these tasks, as described in previous sections:
 - a Shut down the iSCSI Storage Appliance (see page 155).
 - b Replace the flash drive (see page 155).
 - c Power on and configure the iSCSI Storage Appliance (see page 36).

Note When configuring your iSCSI Storage Appliance, use settings that are *identical* to the previous configuration, if possible.

- 2 In the CLI, ensure you are logged on as Administrator. (If you are, a '#' appears at the prompt.)

- 3 Type this command, then press **Enter**:
`controller discover IP_address_of_remote_iSCSI_Storage_Appliance`
- 4 Type this command, then press **Tab**:
`controller add <Tab>`
The list of controllers to be added appears.
- 5 Type this command, then press **Enter**:
`mirror <Tab> plex 1 ip add mirror_plex_IP_address`
- 6 Type this command, then press **Enter**:
`mirror info`
Plex 0 Local and Plex 1 Remote should both appear as Synchronized Online.
All iSCSI target, pool, and logical device information appears online in Adaptec Storage Manager.
- 7 Check the iSCSI initiator to ensure that the iSCSI target connection is re-established. If the iSCSI initiator and iSCSI target are not reconnected:
 - a In the CLI, enter this command, then press **Enter**:
`logical manage volume_name authentication none`
 - b Manually log in to the iSCSI target from the iSCSI initiator. (CHAP is not used.)

The recovery is complete.

Displaying ASM Mirror Volumes and Destroyed Mirror Volumes in the Disk Manager

When you shutdown the controller/JBod and reboot the new master, ASM mirror volumes and destroyed mirror volumes will not be displayed as the corresponding mirror plex is not available. Complete the steps to setup the system as a mirror, without any partner mirror plex.

- 1 Remove the mirror plex, using CLI.
Remove plex (this will not work if the mirror plex is the master)
or
`!mirror manage remove`
- 2 Login to new master target via Microsoft iSCSI GUI.
If required reset the authentication.
`logical manage auth none`
- 3 Import the foreign pool.

4 Login to the old master target using iSCSI GUI.

If required reset the authentication.

logical manage auth none

5 Activate the volume and assign drive letter via Disk Manager.

Completing Stalled Replica Update

When you are updating a replica the replication might get stalled due to non-availability of the destination site.

To complete the replica update:

- 1 Check the availability of the destination site.
- 2 Verify the network connectivity between the source and destination sites.
- 3 Abort the stalled replica update set so that it is changed to Replicated LUF state.
- 4 Reschedule the replica update job.

Unable to Perform Replication When Source and Destination have Static IP Address

When the source and destination sites are in the same network and are assigned with a static IP address in Ethernet port1, the replication will happen. If the IP address of the destination site is changed and set to the private network the replication will not happen. Ensure that for the replication to happen successfully, make sure the iscsi connection of the iSCSI storage appliance have the same IP address and are in the same network.

Configuring iSCSI Initiators

Use the information in this appendix in conjunction with the documentation supplied with your initiator to configure the iSCSI initiators that connect to the iSCSI targets on your iSCSI Storage Appliance.

Configuring iSNS with the CLI

You can use Microsoft iSNS Server to discover targets on an iSCSI network. To download the iSNS package, go to the Microsoft web site and search for *isns*. The package installs a readme file that contains extensive release notes on bug fixes and current iSNS limitations. Be sure to read these notes before attempting to use the service.

Note When you use iSNS, all iSCSI initiators and users can connect to any iSCSI targets—no restrictions are enforced.

- 1 Install the iSNS service on a Windows server. Note the IP address of the server on which the iSNS service is installed.
- 2 Open the CLI on the iSCSI Storage Appliance.

You can access the CLI two ways. Each method presents the CLI automatically:

- Attach a VT100 terminal emulation utility (for example, hyperterminal) to the serial port of the iSCSI Storage Appliance.

Use these terminal emulation program settings to access the CLI:

- Null Modem Cable
- Baud Rate: 115,200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: Off

Note Flow control *must* be set to **Off**. Otherwise, the system will appear to hang.

- Connect to the iSCSI Storage Appliance through a Telnet session (once the initial network values have been set). Telnet to the IP address that is assigned to the management port on the iSCSI Storage Appliance.

3 Log in to the CLI as Administrator, using the password you set in “Step 2: Configuring the iSCSI Storage Appliance” on page 36. If you didn’t set a password, use the default password, admin.

4 Enter:

isns

5 Enter:

server *IP_address*

Where *IP_address* is the address of the iSNS server (see Step 1).

6 To exit the CLI, enter:

end

quit

Note For more information about the CLI, see “Using the CLI” on page 179.

7 Configure iSNS in the iSCSI initiator.

You will need to configure the initiator and add an iSNS server to complete the configuration of iSNS.

For example, from a Windows client:

- When using the Microsoft initiator, run the Microsoft initiator software, select the iSNS Servers tab, and click **Add**. Enter the name or address of the iSNS server, and then click **OK**.
- When using the QLogic4050/4052 initiator, right-click the QLogic adapter and select **Properties**. Select the Discovery Configuration tab, and check **Perform Discovery**. Check **Use iSNS Server**, enter the server name or IP Address, and click **OK**.

Note After you have completed this procedure, all the iSCSI targets on the iSCSI Storage Appliance automatically appear in the Microsoft Initiators target list.

iSCSI Configuration for Microsoft Windows

This section describes how to install and configure these iSCSI initiators for Microsoft Windows:

- MS Initiator
- QLogic4050/4052 Initiator

Configuration Notes

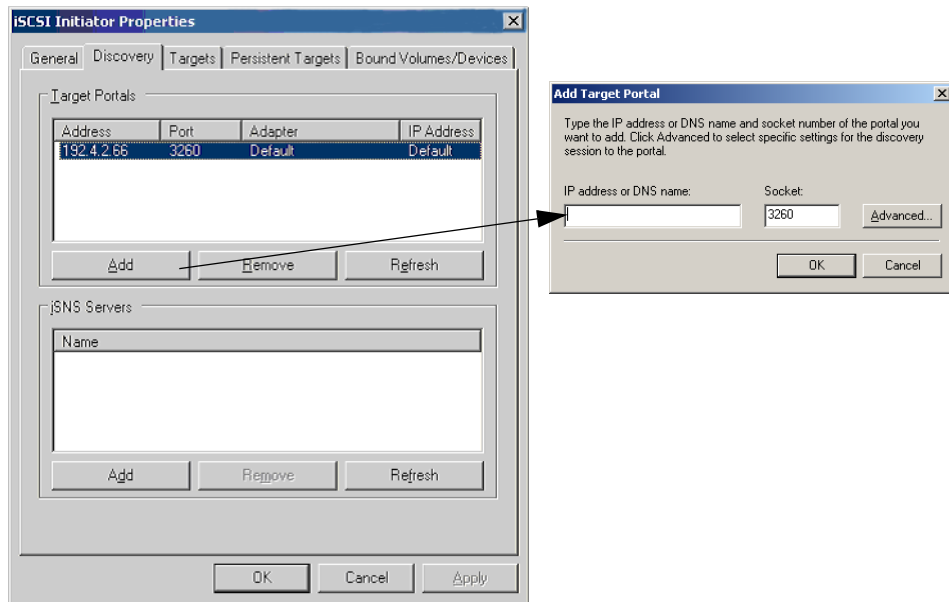
- On Windows XP and Windows 2003 operating systems, Microsoft does not support "dynamic" disks for use with the Microsoft iSCSI initiator. Adaptec recommends using the QLogic QLA4050/4052, which supports "dynamic disks", or using only "basic" disks with the Microsoft initiator to avoid unexpected behavior and possible data loss when using the MS initiator to connect to iSCSI targets in your iSCSI Storage Appliance.
- Choose to install the Microsoft MPIO driver during iSCSI initiator installation.

Configuring the MS Initiator Connection to the iSCSI Storage Appliance (Target Portal)

The Microsoft iSCSI initiator is available for download from the Microsoft support Web site. Search for *iSCSI initiator*, and download the initiator appropriate for your OS version.

- 1 Start up the initiator.

Navigate to **Control Panel > iSCSI Initiator**. When the Properties dialog opens, select the Discovery tab.



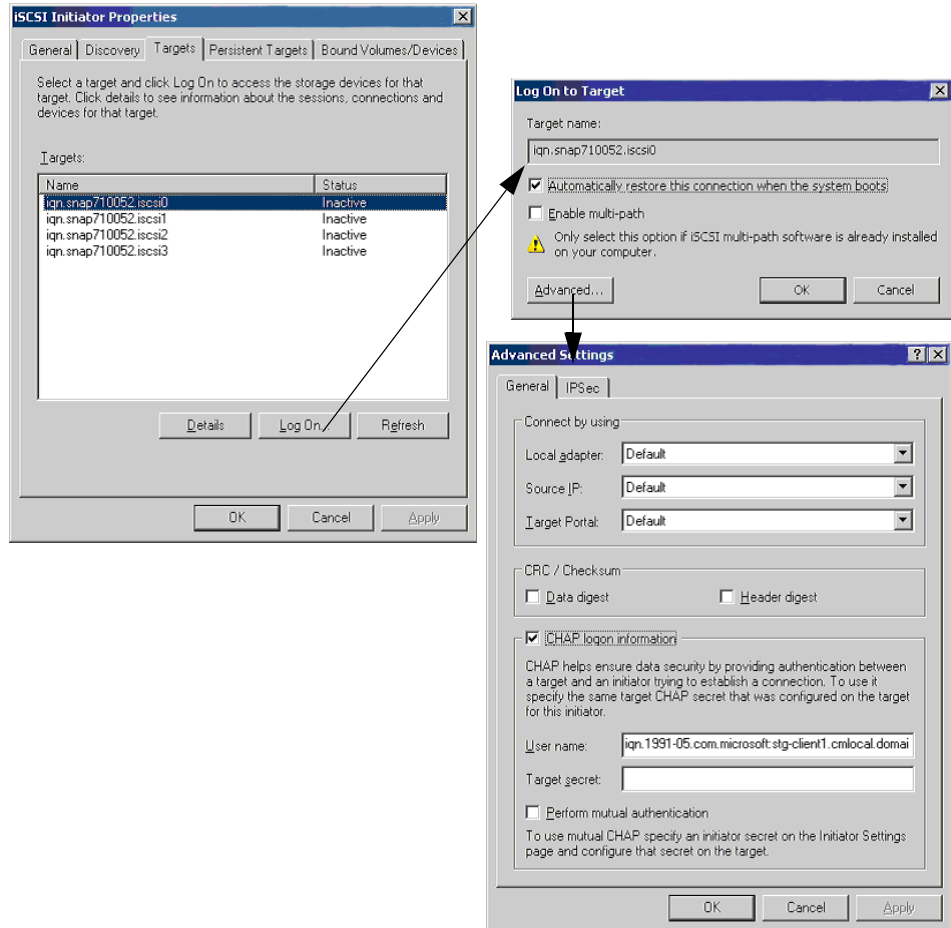
- 2 Define the iSCSI Storage Appliance as a target portal.

Under Target Portals, click **Add**, enter the iSCSI Storage Appliance's IP address or server name, and click **OK**. The server information appears in the Target Portals list box.

Connecting to a Logical Device (iSCSI Target) Using the MS Initiator

- 1 From the Targets tab, log into the logical device.

Select the desired iSCSI target and click **Log On**. To automatically re-establish the connection when the Windows system reboots, select the **Automatically restore...** option.



Note The IQNs for your iSCSI targets may be different than those shown in the examples above.

- 2 Enter the CHAP user name and password (if applicable).

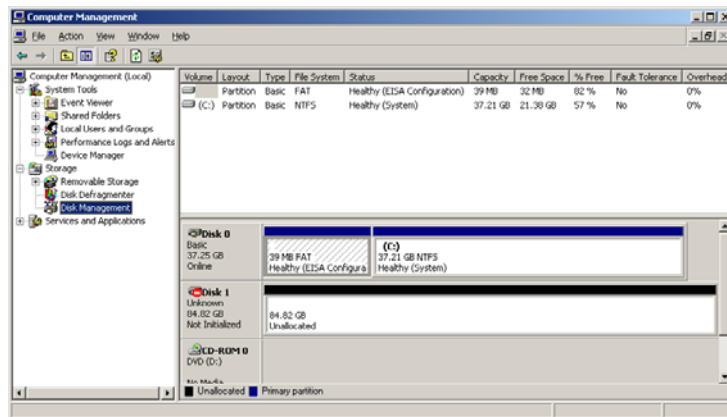
If you are using CHAP authentication, click **Advanced**, click the **CHAP login information** box, and enter the CHAP user name and password you created along with the logical device. Verify that the **Perform mutual authentication** box is unchecked. Click **OK** to return to the Log On to Target window.

- 3 Click **OK** to return to the main window. The status of the Target in the Targets list changes to **Connected**.

Formatting a Logical Device Using the Windows Disk Management Tool

- 1 Open the Windows Computer Management tool.

Navigate to **Control Panel > Administrative Tools > Computer Management**, and select **Disk Management**. If a wizard opens, close it and proceed to the next step as you must manually write the signature to the disk.



- 2 Initialize the logical device.

Right-click the new disk label (Disk 1 in the illustration) and select **Write Signature** (Windows 2000) or **Initialize Disk** (Windows 2003, XP). The new logical device initializes as a *Basic* disk.

- 3 Format the logical device.

Right-click the new disk and select **New Partition** from the right-click menu. Complete the New Partition wizard, accepting the defaults. Once formatted, the disk is labeled *healthy* and is ready for use.

- 4 To turn a QLogic QLA4050/4052 disk into a dynamic disk, right-click the disk in the Disk Management window and select **Convert to Dynamic Disk**. When using the Microsoft iSCSI initiator, dynamic disks are not recommended.

Configuring Microsoft Services Installed on Logical Devices to Start Automatically (MS Initiator)

iSCSI technology allows iSCSI Storage Appliances to host the data files for applications that otherwise require local disk storage, such as MS SQL Server 2000 and Exchange Server 2003. If you use the Microsoft initiator on Windows XP or a Windows 2003 server, services installed on logical devices will start up automatically by default once you have configured them to persistently reconnect. On the Windows 2000 server, however, you must edit the Windows registry to make the service dependent on the iSCSI Initiator Service.

Caution Use the Registry Editor with caution. Changes suggested by Adaptec should be evaluated by qualified technical staff to ensure that they do not affect the proper functionality of the Windows implementation, installed applications, or other components on the Windows system whose registry is being modified. The result of any modifications to the Windows registry can vary, and implied outcomes of any modification suggested by Adaptec are NOT guaranteed, and may not be supported.

Adaptec strongly recommends backing up your registry before making any modifications. Please see Microsoft Knowledge Base article 322755 (Windows 2000) for details on backing up and restoring the Windows registry.

Configuring the Server to Persistently Connect

- 1 As described in previous sections, create a logical device on the iSCSI Storage Appliance and use the MS Initiator and Windows management tools to format the disk.
- 2 From the Target tab of the Initiator's Property dialog box, log in to the iSCSI Storage Appliance target.
- 3 Check the **Automatically restore this connection when the system reboots** box to make this a persistent target.
- 4 Use the Disk Administrator to configure all volumes on top of the disks.
- 5 From the Bound Volumes/Devices tab on the Property dialog box, click **Bind All** to allow the iSCSI service to configure the list of persistent volumes. If you are running Windows XP and Windows 2003 Server, your logical devices will now start automatically on reboot. If you are running Windows 2000 Server, you must continue to the following procedures and edit the registry to make services dependent on the iSCSI Initiator service.

Editing the Windows Registry for MS Exchange Server or MS SQL Server

- 1 Install Exchange Server 2003 and configure it to use the logical device as the location to store database files.
- 2 On a Windows workstation running Windows 2000, enter this on the command line:
regedt32
- 3 Navigate to the Key:
 - a For Exchange Server:
HKey_Local_Machine > System > Current Control Set > Services > lanmanserver
 - b For SQL Server:
HKey_Local_Machine > System > Current Control Set > Services > MSSQLServer
- 4 If the value DependOnService already exists, double-click it. If it does not, create it:
 - a Select **Add Value** from the Edit menu to open the Add Value dialog box.
 - b In the **Name** field, enter:
DependOnService
Click **OK**.
- 5 In the Data box that opens, enter:
MSiSCSI
Click **OK**, and then close the registry.
- 6 Reboot the Windows server.

Configuring Shares to Logical Devices (MS Initiator)

When using the Microsoft initiator, shares to logical devices may not automatically reconnect when the Windows system hosting the shares is rebooted. There are two methods to resolve this issue:

- Share an iSCSI target that has an assigned drive letter. This method requires changes to the Windows registry and is described in Microsoft Knowledgebase article #870964 (<http://support.microsoft.com/kb/870964>).
- Mount the logical device to a folder on an existing NTFS volume as described in "Mounting a Logical Device Without a Drive Letter". This method does not require changes to the Windows registry and is described below.

Mounting a Logical Device Without a Drive Letter

To complete this procedure, you must create and format an iSCSI target on the iSCSI Storage Appliance and connect to this logical device using the Microsoft initiator. You must also have an existing NTFS volume on a local disk within the Windows server, initiating the connection.

- 1 Right-click My Computer and select **Manage**.
- 2 The new formatted volume will appear in the Disk Management window.
- 3 Right-click the **New Volume** and select **Change Drive Letter and Paths...**
- 4 Click **Remove** in the Change Drive Letter and Paths for (New Volume) dialog, and click **Yes** to confirm drive letter removal.
- 5 Right-click the **New Volume** again and select **Change Drive Letter and Paths...**
- 6 Select **Add** in the Change Drive Letter and Paths for (New Volume) dialog.
- 7 In the Add Drive Letter or Path dialog, select **Mount in the following empty NTFS folder**.
- 8 Create a folder or enter the path to the one that will be shared from the Windows server and select **OK**.
- 9 Select **OK** in the Add Drive Letter or Path dialog. This will return you to the Disk Management window.

You will see the icon of a disk in place of the folder icon in the File Management window.
- 10 Create a share to the logical device in the standard method, then reboot the Windows machine and verify that the share is persistent.

Configuring Dynamic Disks to Persistently Reconnect (MS Initiator)

On pre-Vista operating systems, when iSCSI targets are configured as dynamic disks, the Microsoft iSCSI initiator connecting to the dynamic disk may fail to connect properly during system boot. Using dynamic disks for iSCSI targets on pre-Vista operating systems is not supported by Microsoft. For more information, see the *Microsoft iSCSI Software Initiator User's Guide*, available on the Microsoft web site.

Configuring the QLogic QLA4050 and QLA4052 iSCSI Initiators for Microsoft Windows

Requirements

- Windows 2003, Windows 2000, Windows XP installed server.
- Microsoft iSCSI Software Initiator.

Setting Up SAN Boot from Q-logic 4050C/4052C iscsi HBA

Note Before installing qlogic iscsi HBA in the initiator system identified, uninstall the MSFT iscsi software initiator to avoid conflict.

- 1 Install Q-logic 4050C/4052C in the PCI-X slot of the initiator system set to boot from SAN.
- 2 Install the latest HBA drivers from q-logic support site (http://support.qlogic.com/support/product_resources.asp?id=962)
- 3 Ensure to install Ethernet driver and iscsi driver for the card. In Device Manager you should be able to see 2 separate driver install for Network adapter and iscsi adapter.
- 4 Install the SAN surfer management software (version: 5.0.0.32). You can download from q-logic support site (http://support.qlogic.com/support/product_resources.asp?id=962&osid=85)
- 5 Connect Port0 (on 4052) to a know network and assign a static/dhcp.
- 6 Launch the SAN surfer and connect to the local host.

Note SAN surfer will connect only if the port has a valid IP address.

- 7 Set the Initial R2T=yes and IntermediateData=no in the firmware. Click on Port Options – Firmware – Edit and check InitialR2T and uncheck IntermediateData.
- 8 Click **Save Port Settings**. Enter the security password. The default password is *config*.

Note If you have enabled the Boot you may receive a warning to reboot for changes to reflect.

- 9 Reboot the system. Enter Ctrl -Q to enter qlogic bios.
- 10 Select the port identified to boot from SAN. The first port in the list is port 0 for dual port HBA.

- 11 Select Configuration Settings in the Fast UTIL screen. Select Host Adapter Settings, ensure that there is a valid Initiator ip address, subnet mask and gateway. Hit Esc and when prompted, save changes.

Note Set the initiator IP address to be static.

- 12 From CLI, create a logical either selecting the authentication to CHAP or none, and assign it to the qllogic HBA.
- 13 Select Configuration Settings and select iSCSI Boot Settings. Change the Adapter Boot Mode to be Manual. Select Primary Boot Device Setting and key in the IP address of the Target to SAN boot from. Hit ESC and save the changes.

Note The IP address of the target and the Initiator should be on the same subnet. If the authentication type to discover the LUN is set to CHAP, ensure to set the secret and username, in Primary Boot Device Settings.

- 14 From the iSCSI Boot Settings screen, select Primary and hit Enter. The HBA discovers the target. Ensure that the target with a proper iscsi name is displayed in the screen:
- 15 Select Primary Boot Device Settings.
- 16 Save changes and reboot the system. During the Q-logic post, the boot LUN should be displayed with the iSCSI storage appliance build number as shown in the picture below. Change the system BIOS to boot from Q-logic HBA to install OS.
- 17 Load the OS CD, set the system BIOS to boot from the CD first, continue with the installation instruction, select **Adaptec iscsi disk** when prompted where to install. After the OS is completely installed, change the boot settings in the system BIOS to select Adaptec iscsi disk as the first boot device.

iSCSI Configuration for Red Hat or SUSE Linux

This section provides information on supported iSCSI HBAs and initiators for Red Hat and SuSE Linux operating systems.

Setting Up an Out of the Box Cisco Initiator

You can set up Cisco initiator for Red Hat Linux Enterprise Version 4.0 - U4/U5 using these steps.

- 1 Start the iscsi service.
`/etc/init.d/iscsi restart`

- 2 Verify if inbox Cisco-initiator is installed on a RHEL 4 setup, using one of these commands:

- rpm -qf /sbin/iscsid
- rpm -qa | grep iscsi-initiator-utils

If the Cisco initiator is installed, the utility is displayed in the output.

- 3 Set the Cisco initiator as the default initiator. The default initiator can be modified in `initiatorname.iscsi` in `/etc` directory.

For example, the default initiator name can be set as `iqn.1987-05.com.cisco:rhel4`.

- 4 Set the target portal address, target name and the authentication details for CHAP login, in the `iscsi.conf` file present in `/etc` directory.

- For iSCSI portal, uncomment the Discovery address parameter and enter the IP address.

```
-----
# Discovery Address Category
# -----
# To localize parameters to targets found on a particular
discovery address
# (i.e., to override the global settings), you need to use the
# "DiscoveryAddress" setting. The format for the
"DiscoveryAddress" setting is
# a.b.c.d, a.b.c.d:e (where e is a TCP port number), or an
instance name. An
# example of these settings would be:
#
DiscoveryAddress=10.161.205.92
```

- For target name, uncomment `TargetName` parameter and enter the name of the target as listed in CLI.

Note The target name should be modified only for using a particular target.

```
-----
# Discovery Address Category
# -----
# To localize parameters to targets found on a particular
discovery address
# -----
# Target Name Category
# -----
# To localize parameters to targets identified by a particular
target name
# (i.e., to override the global settings), you need to use the
# "TargetName" setting. The format for the "TargetName" setting
is
```

```
# Either the 'iqn' or 'eui' format. An example of these settings
would be:
#
TargetName=iqn.1992-08.com.adaptec:c9c631.20070806040135.11
```

5 Modify the authentication settings,

- one-way CHAP – uncomment OutgoingUsername & OutgoingPassword and enter the same values given when creating a logical device from ASM/CLI.
- Mutual CHAP – uncomment OutgoingUsername, OutgoingPassword, IncomingUsername & IncomingPassword. For incoming username/password we need define those at the target using
 - logical CHAP user
 - logical CHAP password. This password should be different from while creating logical from ASM/CLI.

Note For Mutual CHAP – we cannot use same password for both Outgoing and Incoming.

```
# -----
# AUTHENTICATION SETTINGS
# -----
# To globally configure a CHAP username and password for
  initiator
# authentication by the target(s), uncomment the following lines:
#
OutgoingUsername=user1
OutgoingPassword=adaptecadaptec
#
# To globally configure a CHAP username and password for
  target(s)
# authentication by the initiator, uncomment the following lines:
#
IncomingUsername=user1
IncomingPassword=adaptecadaptec
```

6 Exit all the iSCSI sessions and restart the iSCSI services.

```
/etc/init.d/iscsi restart
```

7 Verify if the new iSCSI device is added.

```
fdisk -l
```

8 Perform all relevant linux commands to partition, format, mount, run stress, and unmount.

iSCSI Configuration for VMware

This section provides information on the setup and configuration of the VMware ESX Server v3.x iSCSI initiator. For more information regarding installation and configuration of required VMware components, refer to the documentation included with the VMware ESX Server installation.

Configuration Notes

- When you install VMware ESX Server, the software iSCSI Initiator is automatically installed. Make sure ESX Server has a VMkernel port for iSCSI traffic and iSCSI port in the ESX Server Firewall is enabled. For more information about configuring your software/hardware iSCSI initiator, refer *VMware iSCSI SAN Configuration Guide*.
- Upon discovering logical devices on the iSCSI Storage Appliance, the VMware ESX initiator will find all assigned logical devices and automatically log into them. If logical devices are distributed across multiple systems, you can use CHAP authentication to restrict the number of logical devices the VMware initiator can access. See “Controlling Access to Your IP SAN with Authentication” on page 85 for more information.
- When adding a new ESX initiator to the Auto-discovery Control List, you must have the “uses permanent discovery session” option enabled. For more information refer “Modifying a Discovery Control List” on page 84.

Using the VI Client to Configure iSCSI Services

Follow the instructions in the *VMware iSCSI SAN Configuration Guide*, available at <http://www.vmware.com> to configure and enable your iSCSI service.

To setup discovery address for iSCSI logical devices:

- 1 Login to VI Client and select the ESX server from the inventory panel. Select **Configuration** tab and click **Storage Adapters**.
- 2 Under Storage Adapters, select the iscsi initiator to configure and click **Properties**. The iSCSI Initiator Properties dialog box appears.
- 3 Select **Dynamic Discovery** tab and click **Add...** to add ip address of your iSCSI storage appliance.
- 4 Click **OK** to save changes.

To setup CHAP Parameters:

- 1 Select **CHAP Authentication** tab and click **configure**.
- 2 In the CHAP Authentication dialog box, select **Use the following CHAP credentials** and specify your CHAP username and password.

3 Click **OK** to save changes.

To connect and use the discovered iSCSI logical devices:

- 1** Under **Storage Adapters** configuration, select the iscsi initiator and click **Rescan**. All assigned logical devices will be displayed in panel below.
- 2** Under **Storage configuration**, click **Add Storage** and select Disk/LUN as storage type.

Select the iSCSI logical device for your datastore, specify the datastore name, maximum file size, and maximum capacity and click **Next**.

Using the CLI

The Command Line Interface (CLI) software is a terminal-based command line interface that allows you to monitor and manage the iSCSI Storage Appliance. You can use the CLI to create and manage iSCSI targets that will appear as local disk storage on your server. You can use the CLI's event logging features to monitor the entire system.

This appendix introduces the CLI and provides instructions for using the CLI to configure the settings on your iSCSI Storage Appliance.

Accessing the CLI

You can access the CLI two ways. Each method presents the CLI automatically:

- Attach a VT100 terminal emulation utility (for example, hyperterminal) to the serial port of the iSCSI Storage Appliance.

Use these terminal emulation program settings to access the CLI:

- Null Modem Cable
- Baud Rate: 115,200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: Off

Note Flow control *must* be set to Off. Otherwise, the system will appear to hang.

- Connect to the iSCSI Storage Appliance through a Telnet session (once the initial network values have been set.)

Telnet to the IP address that is assigned to the management port on the iSCSI Storage Appliance.

Note The default administrator password is admin.

Access Levels and Passwords

The CLI has two levels of access: operator or administrator. The default password for both levels is admin.

Operator-Level Access

From the operator level, you can monitor the current status of the iSCSI Storage Appliance, but you cannot make any configuration changes.

To set the operator password, type:

```
password operator <Enter>
new password ***** <Enter>
confirm new password ***** <Enter>
```

Note You must be in Administrator level to set passwords.

Administrator-Level Access

From the administrator level, you have full access to all the features of the software and can make changes to the configuration of the iSCSI Storage Appliance.

Note The default administrator password is admin.

To change the administrator password type:

```
password administrator <Enter>
new password ***** <Enter>
confirm new password ***** <Enter>
```

Switching Access Levels

To switch from operator level to administrator level, type administrator, press **Enter**, type the administrator password, then press **Enter**.

To switch from administrator level to operator level, type operator.

Note If you forget a password, you can log into the iSCSI Storage Appliance by connecting a serial cable to the COM 1 port of the iSCSI Storage Appliance and using a terminal emulation program, such as Hyperterminal. (For terminal emulation program settings, see page 179.) You are not required to enter a password. Set up new passwords by following the instructions in “Operator-Level Access” or “Administrator-Level Access” on this page.

Using the Wizard to Configure Your iSCSI Storage Appliance

The Setup wizard runs if the iSCSI Storage Appliance is in factory default state when the CLI is started. (You can also run the Setup wizard by typing `setup`.) The Setup wizard prompts you to enter the information required to connect the iSCSI Storage Appliance to a local network. In addition to typing in the values (the answers to the questions), you can also use the three commands in this table.

Command	Function
*abort	Quit the Setup wizard without changing anything
*back	Go to previous question
Help	Describe the current options

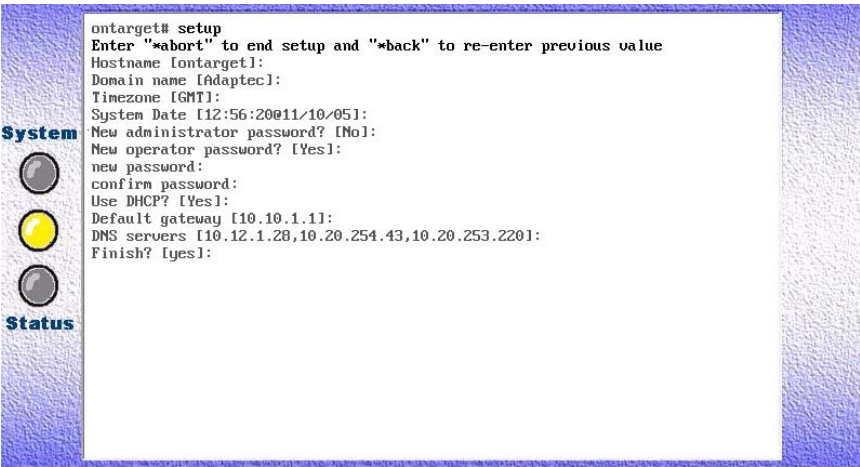
If a question has a predefined or default answer, the answer appears in square brackets [].

Some values take an arbitrary string, in which case you can't use the `*back` or `*abort` commands. In those circumstances, enclose the answer in double-quotes " " so that the answer will be accepted even if it is the same as a command.

To configure the iSCSI Storage Appliance:

- 1 Power on the iSCSI Storage Appliance.

The Command Line Interface (CLI) Setup wizard opens.



The CLI Setup wizard then prompts you to enter the values you prepared in “Before You Begin” on page 34.

Note Adaptec highly recommends that you record the values you enter during this task and store them for future reference.

- 2 At the Hostname prompt, type a name for the iSCSI Storage Appliance, then press **Enter**. Use alphanumeric characters, such as Hostname or Hostname1.
- 3 Type the network domain to which the iSCSI Storage Appliance belongs, then press **Enter**. Use alphanumeric characters, such as Domain or Domain1.
- 4 Press **Enter** to accept the current system date, or type a new date, then press **Enter**. Use this format: [hh:mm:ss@mm/dd/yy]
- 5 Press **Enter** to accept the current time zone, or type a new time zone, then press **Enter**. Use this format: GMT+12 – GMT-12
- 6 Type yes (the whole word, not just “y”) to create a new administrative password, then press **Enter**. Type the new password, then press **Enter**. Confirm the new password, then press **Enter**.
- 7 Type a new operator password, then press **Enter**. Confirm the new password, then press **Enter**.
- 8 Press **Enter** to accept the DHCP default setting (No).
- 9 Press **Enter**, or type a default gateway address (the name or IP number of a router to which packets for destinations that do not have routes defined for them in the system should be sent), then press **Enter**.
- 10 Press **Enter**, or type the IP addresses of your DNS servers (up to three are supported), then press **Enter**.
- 11 Type the IP address for the iSCSI Storage Appliance, then press **Enter**. Use this format: xxx.yyy.zzz.aaa
- 12 Type the netmask of the iSCSI Storage Appliance, then press **Enter**. Use this format: xxx.yyy.zzz.aaa
- 13 Type the IP address to be used for broadcasts, then press **Enter**. Use this format: xxx.yyy.zzz.aaa
- 14 When the configuration is complete, the host name given to the iSCSI Storage Appliance displays (for example, myhostname#).
- 15 Type quit, then press **Enter** to log out of the CLI.
- 16 Disconnect from the iSCSI Storage Appliance.

Caution To avoid permanent data loss, *do not* modify the default BIOS settings of the RAID controller. To safely configure or modify the iSCSI Storage Appliance, use either the CLI or Adaptec Storage Manager only.

About CLI Commands and Parameters

A command is an area of functionality (for example, *pool*), followed by an action (for example, *create*), and possibly also followed by one or more parameters (for example, *pool_name*). For example:

```
pool create mypool
```

Different commands are available depending on what access level you're working in (operator or administrator) and on what the context the CLI is running in.

Many commands take lists, which are terminated by the end of the line or by another keyword.

About Parameters

Parameters may be in a fixed or variable order. When parameters are in a fixed order, the CLI uses their position on the line to determine what they signify. When parameters are in a variable order, they are preceded by a keyword that the CLI uses to determine what they signify.

About Manage Commands

The manage commands are distinctive, because they take as a parameter an item to be acted upon (for instance, a logical device or a disk) and apply to it other commands with their own sets of parameters. For example:

```
port manage port topology topology
```

where *topology* may be considered a separate command within the manage command.

Command Abbreviation

Most commands and parameters can be abbreviated to their shortest unique abbreviation. For example, if you are in the Operator level and wish to change to the Administrator level, all you have to type is *admin*.

About the Command Format in This Guide

In this *Guide*, these formats are used to express commands and parameters.

Format	Examples	Description
command or parameter	device identify logical	The command to be entered.
<i>command</i> or <i>parameter</i>	raid-level stripe-depth name	The type of value to be entered.
[parameter]	[<i>device list</i>] [<i>options</i>] [start stop]	The parameter is optional. If all of a command's parameters are optional, at least one must be entered unless the parameter list itself is enclosed in square brackets [].
value value	start stop enable disable	Multiple values are available for a parameter but only one of the values may be entered.

Command Completion

You can request a command completion at any time by pressing the **Tab** key.

If the partial command you've typed can be completed by only one possible option, pressing **Tab** adds that option to the end of the line automatically.

If the partial command you've typed can be completed by one of several options, pressing **Tab** lists those options and redisplay the partial command. If those options have a common root, it is added to the partial command automatically. (If the partial command you've typed can't be completed with any option, pressing **Tab** has no effect.)

When options, such as a range of numbers or class of objects, can't be listed, a description appears instead, enclosed in angle brackets < >, to clarify what information is being requested. For example, <name> or <stripedepth> (as shown below).

```
Enclosure1# pool create a2 raid5 <TAB>
1024      16      32      64
128      256     512     <stripedepth>
```

Command and Parameter Separation

Commands and parameters are separated with one or more spaces and/or tab characters (white space). White space at the start and end of a command line is ignored.

Character Case and White Space

In general, the CLI is *not* case-sensitive. Commands and parameters can be typed using any combination of upper and lower case letters¹.

However, all IQNs, iSCSI Aliases, and initiator names must be entered in lower-case letters.

If a white space character has to be entered as part of a parameter, enclose the parameter in a pair of double-quotes (" "). Everything between the quotes, including any enclosed white space, is used as the parameter—the double-quotes are not used as part of the parameter.

Command Line Editing

You can edit commands and parameters by using the keystrokes described in this table.

Keystroke	Function
Ctrl+A	Jump to the start of the line
Ctrl+B	Move cursor back one character (left)
Ctrl+C	Escapes and terminates lengthy jobs
Ctrl+D	Delete the character at, or in front of, the cursor
Ctrl+E	Jump to the end of the current line
Ctrl+F	Moves cursor forward one character
Ctrl+H; or Backspace	Erases a mistake when entering a command
Ctrl+K	Delete from the cursor forward to the end of the line
Ctrl+N; or down arrow	Display the next command in the command history
Ctrl+P; or up arrow	Display the previous command in the command history
Ctrl+S	Search for a command in the command history
Ctrl+T	Transpose two characters
Ctrl+U	Delete complete line
Esc B	Move cursor back one word

1. There may be a few exceptions, such as file names, where case is significant.

Keystroke	Function
Esc D	Deletes from cursor to end of the word
Esc F	Moves cursor forward one word
Tab	Complete the command or display alternatives if there is more than one possible command
Q	Moves cursor to end of multi-page list

Viewing Long Reports

When a command generates a report (including help messages) that is longer than one page, only the first page of the report is displayed; the rest of the report can be viewed by using the keystrokes in this table.

Keystroke	Function
B	Previous page
D or J	Down to next line
E or >	Advance to end of report
H or ?	Display this list
N or F or <Enter> or <Space>	Next page
P or <	Back to first page
Q	Quit report
R or <F5>	Redraw current page
U or K	Up to previous line

The CLI and Adaptec Storage Manager

The CLI and Adaptec Storage Manager occasionally differ in terminology and other types of information.

- Adaptec Storage Manager uses a disk drive's World Wide Name (WWN), the CLI uses the disk drive's device ID for drive numbering.
- Separate status PDU (Adaptec Storage Manager) and Piggybacking of SCSI status (CLI) both refer to an advanced iSCSI initiator setting.

Getting Help

You can request help at any time by typing `help` or `?` anywhere in a line. The type of help provided depends on where you are in the CLI. For instance, typing `help` may generate a list of valid commands or parameters, or a list of all available commands.

You can request a command completion at any time by pressing the **Tab** key (see “Command Completion” on page 184 for more information).

Your Snap Server 700i Series

This appendix provides information and assistance to system or network administrators preparing for the installation of a Snap Server 700i Series iSCSI Storage Appliance on their network. Every network topology is different, and every administrator works with different goals and resources. Using this appendix, administrators can determine what additional hardware components to acquire and what network configurations are possible.



Hardware Components

The Snap Server 700i Series comes with the hardware required to install the server into an EIA-compliant rack (if applicable), as well as the cables required to connect the server to a power source and to an Ethernet network. Other hardware required for a basic installation, such as Ethernet switches, racks, and UPS devices, must be supplied by the administrator from third-party vendors. You can also create advanced configurations using the SANbloc S50 expansion array to add capacity.

The hardware checklists in this appendix show the required and optional hardware components that are available.

Product Descriptions

The Snap Server 700i Series provides a cost-effective, low-maintenance network block iSCSI solution that supports simultaneous access by Windows and Linux hosts. All Adaptec OnTarget-powered Snap Servers come with three or four Gigabit Ethernet (GbE) ports, dual processors, and a SAS card for connecting to a SANbloc S50 expansion array.

Model	Description
Snap Server 700i Series 	The Snap Server 720i, 730i, and 750i are 1U iSCSI Storage Appliances with: <ul style="list-style-type: none">• 4 redundant, hot-swappable SATA disk drives (720i and 730i only).• 4 redundant, hot-swappable SAS disk drives (750i)• Dual power supplies (730i and 750i)• Expandable by attaching multiple SANbloc S50 expansion arrays.
SANbloc S50 	The SANbloc S50 is a 2U expansion array with 12 hot-swappable SAS or SATA disk drives that adds capacity to the Snap Server 700i Series.

All rack-mountable Snap Servers and expansion arrays come with the cables and hardware required to install them into a rack and connect them to the network or other Snap Server storage products. Customers supply the rack, Ethernet switches, and UPS devices.

The capacity of the Snap Server can be enhanced by attaching one or more SANbloc S50 expansion arrays. If your SANbloc S50 expansion array came with less than the maximum number of drives, it can be upgraded to increase available capacity.

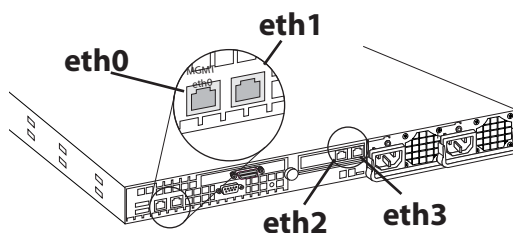
- **Use only internal hardware components qualified by Adaptec** — Adaptec strongly recommends that you use only qualified components from authorized Adaptec resellers. *Qualified* means that Adaptec technicians have tested and verified that the component operates properly with the Snap Server 700i Series and other network components. Failure to use qualified components may seriously impact data availability, could potentially lead to data loss and corruption, and will void your warranty.

- **Standardize on a single vendor for external hardware components** — Not only will standardization on a single vendor minimize the chance of unforeseen interoperability failures, it will also simplify troubleshooting procedures.

Notes (1) For a complete list of qualified components, including replacement parts and installation instructions, see <http://www.snapserver.com/support>; (2) To find an authorized reseller in your area, go to <http://www.snapserver.com> and click the **Where to Buy** tab.



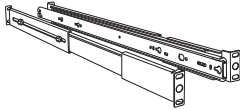

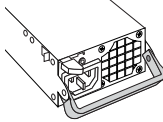
Identifying the Ethernet Ports

The Snap Server 700i Series have an on-board NIC card with two Ethernet ports (eth0 and eth1). In addition, the Snap Server 720i has a single-port NIC (eth2) and the Snap Server 730i and 750i have a dual-port NIC (eth2 and eth3). The illustration below identifies the location of each of these Ethernet ports.



Basic Hardware Shipped with Snap Server 700i Series

In addition to the enclosures and disk drives, the Snap Server 700i Series comes with these cables and components:

Component	Description
Power Cables 	<p>Three different power cables are provided for each power supply. These cables comply with power supply requirements of these countries:</p> <ul style="list-style-type: none">• United States• United Kingdom• Europe
Ethernet Cables 	<ul style="list-style-type: none">• The Snap Server 720i has three(3) 10/100/1000 Ethernet ports. Three Ethernet cables are supplied.• The Snap Server 730i and 750i have four (4) 10/100/1000 Ethernet ports. Four Ethernet cables are supplied. <p>Note SANbloc S50 expansion arrays connect to a host Snap Server 700i Series, not directly to the network, and thus do not ship with Ethernet cables.</p>
Rack Mount Assemblies 	<p>Mounting brackets or slide rail assemblies for installing the server into a standard EIA rack come with every rack-mountable Snap Server 700i Series. See the next section, "Basic Hardware To Be Acquired from Third-Party Vendors" for additional requirements for your Snap Server 700i Series or expansion array.</p>
Expansion Cables 	<p>A SANbloc S50 expansion array connects to its host Snap Server 700i Series via a SAS cable. SANbloc S50s come with one SAS external cable.</p>
Dual Power Supply 	<p>The Snap Server 730i and 750i come with dual power supplies. The Snap Server 720i comes with a single power supply but can be upgraded to a configuration with dual power supplies, which can be ordered separately by going to http://www.snapserver.com and selecting the Where to Buy tab.</p>


Basic Hardware To Be Acquired from Third-Party Vendors

The hardware components listed in the following table are to be supplied by the customer from third-party vendors.

Component	Description
Ethernet Switch(es)	For optimal performance, use only switches that support GbE.
APC-Brand UPS Device(s)	Adaptec recommends that you use a UPS with the Snap Server 700i Series. Snap Servers are compatible with USB-based and network-based APC-brand uninterruptible power supplies that allow you to take advantage of the automatic shutdown capability. Visit the APC Web site for a listing of optimal APC models for use with your Snap Server 700i Series.
Rack for 1U Units Snap Server 700i Series	The Snap Server 700i Series comes with two (left and right) slide rails and must be installed in a four-post, 32" deep (or greater) EIA-compliant rack. Note Mounting the Snap Server 700i Series into a two-post rack is not supported.
Rack for 2U units SANbloc S50 expansion array	The SANbloc S50 expansion array comes with adjustable front and rear slide rails and must be installed in a four-post EIA-compliant rack. Note Mounting the S50 into a two-post rack is not supported.

Optional Expansion Cards and Cables

The capacity of the Snap Server 700i Series can be expanded by attaching one or more SANbloc S50 expansion arrays.

Component	Description
SAS Cable 	The SANbloc S50 comes with one SAS cable to connect to the Snap Server 700i Series.

Optional Expansion Arrays

SANbloc S50 Configuration Options and Requirements

Snap Server 700i Series

- If using SATA drives, up to four (4) S50 expansion arrays can be connected to the Snap Server 700i Series, supporting a maximum of 48 disk drives.
- If using SAS drives, up to eight (8) S50 expansion arrays can be connected to the Snap Server 700i Series, supporting a maximum of 100 disk drives.

Snap Server and Expansion Array Hardware Checklists

Hardware checklists show all hardware required for the installation of a Snap Server 700i Series or SANbloc S50 expansion array. Use the checklist to calculate the necessary rack allocations, switches, cables, and other materials needed for your chosen configuration prior to the arrival of the storage system.

Snap Server 700i Series Hardware Checklists

- Snap Server 720i Hardware Checklist
- Snap Server 730i and 750i Hardware Checklist
- SANbloc S50 Hardware Checklist

Legend for Checklists

The following symbols indicate which hardware components come with each Snap Server 700i Series:

- ☒ The described item comes with the Snap Server 700i Series.
- ☐ The described item must be obtained separately.
- ☒ The described item is available as an option for this Snap Server 700i Series model.

Snap Server 720i Hardware Checklist

The following checklist shows the required and optional hardware to install a Snap Server 720i, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> Ethernet Cables (3 per enclosure) Required to connect the Ethernet port(s) to the network.
	<input checked="" type="checkbox"/> Power Cables (3 per enclosure) Required to plug into the mains (1 US, 1 UK, 1 EU).
	<input type="checkbox"/> Ethernet Switches Use switches that support GbE.
	<input type="checkbox"/> APC-Brand UPS Device(s) (optional) Snap Servers are designed to work with a USB-based or network-based APC-brand UPS. Visit the APC Web site for a listing of optimal APC models.
Rack	<input checked="" type="checkbox"/> Slide Rail Assemblies (2 per enclosure) Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> 32 inch/36 inch, Four-post Rack You must use a 32-inch (or greater) four-post rack to mount this server.
Expansion	SAS Card
	<input checked="" type="checkbox"/> Required to connect to an S50 expansion array.

Snap Server 730i and 750i Hardware Checklist

The following checklist shows the required and optional hardware to install a Snap Server 730i or 750i, and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Network and Power	<input checked="" type="checkbox"/> Ethernet Cables (4 per enclosure) Required to connect the Ethernet port(s) to the network.
	<input checked="" type="checkbox"/> Power Cables (6 per enclosure) Required to plug into the mains (2 US, 2 UK, 2 EU).
	<input type="checkbox"/> Ethernet Switches Use switches that support GbE.
	<input type="checkbox"/> APC-Brand UPS Device(s) (optional) Snap Servers are designed to work with a USB-based or network-based APC-brand UPS. Visit the APC Web site for a listing of optimal APC models.
Rack	<input checked="" type="checkbox"/> Slide Rail Assemblies (2 per enclosure) Two (2) slide rails and screws for attaching the server to a rack.
	<input type="checkbox"/> 32 inch/36 inch, Four-post Rack You must use a 32-inch (or greater) four-post rack to mount this server.
Expansion	<input checked="" type="checkbox"/> SAS Card Required to connect to an S50 expansion array.

SANbloc S50 Hardware Checklist

The following checklist shows the required and optional hardware to install an S50 , and indicates whether a component comes with the server or must be supplied by the customer.

Component	Description
Connection and Power	<input checked="" type="checkbox"/> SAS Cable (1 per enclosure) Required to connect the expansion array to the host Snap Server 700i Series.
	<input checked="" type="checkbox"/> Power Cables (2 per enclosure) Required to plug into the mains.
	<input type="checkbox"/> APC-Brand UPS Device(s) (optional) The S50 should be connected to the same UPS as the Snap Server to which it is attached.
Rack	<input checked="" type="checkbox"/> Rack Mount Brackets Two (2) rack mount shelves and screws for attaching the server to a rack.
	<input type="checkbox"/> EIA-Compliant Rack S50 expansion arrays are designed for use with EIA-compliant 4-post racks.

Snap Server and Expansion Array Hardware Specifications

This section provides hardware specifications for the Snap Server 700i Series and SANbloc S50 expansion arrays. Specifications are subject to change without notice; for updates to and further information on the specifications, see <http://www.snapserver.com>.

Caution Use only qualified components purchased from an authorized Adaptec reseller to service Snap Server storage products. *Qualified* means that Adaptec technicians have tested and verified that the component operates properly with the Snap Server and other network components. Failure to use qualified components may seriously impact data availability, potentially lead to data loss and corruption, and will void your warranty.

Snap Server 700i Series Specifications

Feature	Specification
Network Connection	Autosensing 10/100/1000Base-T, dual RJ-45 network connectors, with support for load-balancing and failover.
Dimensions	Width 17.5 in (444.5 mm) Depth 28.07 in (713 mm) Height 1.75 in (44.45 mm), 1U Weight 40 lbs (18.5 kg)
Power	Power Rating: 400W, 100-240 VAC, 50-60Hz, Input Current: 3.4A (RMS) for 115VAC, 2.3A (RMS) for 230VAC Power Consumption: 290W (steady state), 360W (maximum) Heat Dissipation: 990 BTUs/hr
Operating Environment	50° F to 95° F (10° C to 35° C) 20% to 80% humidity (noncondensing) Vibration: .10G at 10-300Hz Random for 120 min. max duration Shock: 6 pulses of 33G for up to 2ms Altitude: 0 ft. to 10,000 ft. (0m to 3,048m)
Nonoperating Environment	14° F to 149° F (-10° C to 65° C) 5% to 95% humidity (noncondensing) Vibration: 2G at 5-500Hz for 90 min. max duration Altitude: 0 ft. to 35,000 ft. (0m to 10,668m)
Regulatory Certifications	UL, cUL, CE, FCC Class A, TuV, NEMKO, CTick

SANbloc S50 Specifications

Feature	Specification
Network Connection	SAS connection to Snap Server 720i, 730i and 750i. No direct network connection.
Dimensions	Width17.6 in (44.7 cm) Depth19.5 in (49.5 cm) Height3.5 in (8.9 cm), 2U Weightup to 60 lbs (27 kg) maximum
Power	Power Rating: 100-240 VAC Current Rating: 6–2.5 Amps Outputs: <ul style="list-style-type: none">• +5 V @ 37.5 A• +12 V @ 20.0A• +3.3 V @ 1.0 A Maximum Average Output Power: 430 Watts Maximum Peak Output Power: 491 Watts Heat Dissipation: 169 BTUs/hr
Operating Environment	5° C to 40° C 10% to 80% humidity (noncondensing) Vibration: 5-400 Hz random at .15 G Shock: 8 G half sine shock with pulse duration of 11 milliseconds or less. Altitude: -200 ft. to 10,000 ft. (xxm to 3,048m)
Nonoperating Environment	-40° C to 70° C 5% to 95% humidity (noncondensing) Shock: 15 G half sine shock with pulse duration of 11 milliseconds or less. Vibration: 5-400 Hz random at .5 G Altitude: -200 ft. to 40,000 ft. (xxm to 10,668m)
Regulatory Certifications	UL, cUL, CE, FCC Class A, TuV, TuV-CB, VCCI, CSA, CTick

Safety Precautions

- **Environmental Conditions** — Make sure the physical environment in which the unit resides falls within the specifications for your model as described in this guide.
- **Installing the Server or Expansion Array** — During installation, make sure the unit is always placed on a surface capable of supporting its weight.
- **Connecting to the Main Power** — Install the unit near an easily accessible power source. Make sure the source is the proper voltage for your model. Place the power cord(s) out of the way of traffic; do not place any object over the power cord(s). If the unit is taken offline for an extended period, disconnect it from the power source to avoid possible damage from a power surge.
- **Enclosure Openings** — Openings in the enclosure ensure proper airflow and prevent overheating; do not cover these openings. Never place liquids on or near the unit to avoid spillage; liquid entering an enclosure opening could cause fire or electrical shock.
- **Cleaning the Unit** — Before cleaning the unit, be sure to disconnect all cabling. Do not use any liquid or spray cleaning agents to clean the unit; use only a damp sheet or cloth.
- **Servicing the Unit** — Never open the unit. For safety reasons, the unit should only be opened under the guidance of qualified service personnel.

If one of the following situations arises, do not attempt a remedy; contact Adaptec technical support for assistance before proceeding:

- The power cord or plug is damaged.
- Liquid has penetrated the server.
- The unit has been exposed to moisture.
- The unit is dropped or otherwise physically damaged.
- The unit has obvious signs of damage.

RAID Quick Reference

This appendix provides quick-reference information about the RAID levels supported by your iSCSI Storage Appliance.

Comparing RAID Levels

Use this table to select the RAID levels that are most appropriate for the pools on your IP SAN, based on the number of available disk drives and your requirements for performance and reliability. Only the RAID levels supported by your iSCSI Storage Appliance are listed.

RAID Level	Redundancy	Disk Drive Usage	Read Performance	Write Performance	Minimum Disk Drives
RAID 0	No		***	***	2
RAID 1	Yes	100%	**	**	2
RAID 10	Yes	50%	**	**	4
RAID 5	Yes	50%	***	*	3
RAID 6	Yes	67% – 94%	**	*	4
Spanned Volume	No	50-88%	*	*	2

Disk drive usage, read performance, and write performance depend on the number of drives in the pool. In general, the more drives, the better the performance. More information about each RAID level is available in the Glossary on page 213.

Note None of the RAID levels listed include a built-in hot spare.

Selecting a RAID Level by Size of Pool

Use this table to select a RAID level based on the number of disk drives in your pool.

Number of Disk Drives in Pool	Possible RAID Levels
One	Simple volume

Number of Disk Drives in Pool	Possible RAID Levels
Two	RAID 0 or RAID 1
Three or more	RAID 0 or RAID 5

Expanding Pool Capacity

Using Adaptec Storage Manager, you can expand the capacity of a pool by adding one or more disk drives (see page 96). You can expand pools with any of these RAID levels: RAID 0, RAID 5, RAID 6.

Changing from One RAID Level to Another

Using Adaptec Storage Manager, you can change a pool's RAID level. Changing a pool's RAID level may also increase its capacity. This table lists supported migrations:

From RAID Level	To RAID Level
Simple Volume	RAID 1
RAID 0	RAID 5 or RAID 10
RAID 1	Simple Volume, RAID 5, or RAID 10
RAID 5	RAID 6

You can also migrate from RAID 1 or RAID 5 to RAID 0. If the pool has a spare drive associated with it, the RAID 0 pool retains the spare drive.

Note Migrations that do not involve a change in RAID level are also supported in RAID 0, RAID 1, RAID 5, and RAID 6. See "Expanding Pool Capacity" on page 202 for more information.

Completing a Silent Windows Installation

This appendix describes how to complete a silent Windows installation of Adaptec Storage Manager instead of following the installation instructions provided in “Installing on Windows” on page 27. A *silent installation* uses command line parameters to complete an installation without messages or user interaction.

Note If a previous version of Adaptec Storage Manager is installed on your system, you must remove it before beginning this installation. Use the Add or Remove Programs tool in the Control Panel.

Completing a Silent Installation

You will need the User CD to complete this task.

To complete a silent installation:

- 1 Insert the CD into your CD drive.
- 2 Open a command prompt window and change to the CD directory.
- 3 Install Adaptec Storage Manager using this command line string:

```
setup.exe /s /v" /qn <properties>"
```

where <properties> is one or more of the options listed in the next section, [Available Properties and Values](#).

Separate properties with spaces; separate feature names for the ADDLOCAL property with commas (see examples on page 206).

Note Synchronous Installation—To install Adaptec Storage Manager so that the setup.exe file does not close until the installation is complete, add the /w parameter to setup.exe and run the application with the start /WAIT command as shown in this example:

```
start /WAIT setup.exe /w /s /v" /qn <OPTIONS>"
```

You might want to do this for a batch file installation so that the setup will not return until the installation is finished.

After a minute or two, the silent installation should be complete and the Adaptec Storage Manager icon should be accessible. Continue with “Setting Up Your iSCSI Storage Appliance and IP SAN” on page 33.

Available Properties and Values

Property	Values
INSTALLDIR (Not required)	<p>Specifies the installation path. If you are specifying the installation path, it must be set for a command line install, and must be enclosed in escaped quotation marks.</p> <p>For example: INSTALLDIR="C:\Program Files\Adaptec\Adaptec Storage Manager\"</p> <p>Note: If you do not explicitly set the installation path, the default path is "C:\Program Files\Adaptec\Adaptec Storage Manager"</p>
USERNAME (Required)*	<p>Specifies the log-in user name for the Management Service.</p> <p>*This Property is required only if the Management Service feature is installed.</p>
PASSWORD (Required*)	<p>Specifies the log-in password for the Management Service.</p> <p>*This Property is required only if the Management Service feature is installed.</p>
MGMTLOC (Required*)	<p>Specifies the location of the local or remote Management Service to allow access for VDS/VSS. This value should be the local computer name, not "localhost".</p> <p>*This Property is required only if VDSEExternal or VSSEExternal features are installed.</p>
MGMTUSER (Required*)	<p>Specifies the Management Service log-in user name to set up VDS/VSS access. If you are installing the Management Service onto the local computer, this value is the same as the USERNAME property.</p> <p>*This Property is required only if VDSEExternal or VSSEExternal features are installed.</p>

Property	Values
ADDLOCAL (Required)	<p>Note: Use commas to separate multiple values.</p> <ul style="list-style-type: none"> ALL—Installs all of the following features. If you specify ALL, do not also specify any of the following values. Agent—Installs the Adaptec Storage Manager Direct Attached Storage Agent. If this feature is installed, the machine will reboot if certain RAID controllers that use the filter driver are installed. If necessary, use the REBOOT property to suppress this. ASMReadme—Installs the Readme file in its Start menu shortcut. CLITools—Installs the Command Line Interface tool. Console—Installs the Adaptec Storage Manager GUI. DSM (Windows 2000 and Windows Server 2003 x86 or x64 only)—Installs the MPIO DSM. Currently, the MPIO DSM CAN NOT BE INSTALLED SILENTLY; user intervention is required to begin the DSM driver installation and to reboot following installation. If necessary, use the REBOOT property to suppress this. This value is supported by Windows 2000 and Windows Server 2003 x86 only. ManagementService—Installs the iSCSI Storage Management Service. Requires you to set user name and password properties. SNMP Support—Installs SNMP support for Adaptec Storage Manager. Requires the Agent feature to be installed, also. If you select the SNMPSupport feature, the Agent feature is automatically included, even if you don't specify it. VDSExternal (Windows Server 2003 R2 x86 only)—Installs support for VDS for iSCSI storage. Requires Microsoft iSCSI Software Initiator v.2.02 or higher. Also requires that you also set the MGMTLOC, MGMTUSER, and MGMPASS properties. VDSPProvider (Windows Server 2003 x86 only)—Installs support for VDS for direct attached storage RAID controllers. VSSExternal (Windows Server 2003 R2 x86 or x64 only)—Installs support for VSS. Requires Microsoft iSCSI Software Initiator v.2.02 or higher. Also requires that you also set the MGMTLOC, MGMTUSER, and MGMPASS properties. WinAgent (Windows Server 2003 x86 only)—Installs the iSCSI Storage management agent. Requires Microsoft iSCSI Software Initiator v.2.02 or higher. Also requires that the DSM and VSSExternal features also be installed.

Property	Values
MGMPASS	Specifies the Management Service log-in password to set up VDS/VSS access. If you are installing the Management Service onto the local computer, this value is the same as the PASSWORD property. *This Property is required only if VDSEExternal or VSSEExternal features are installed.
REBOOT (Not Required)	<ul style="list-style-type: none"> Force—Forces a reboot at the end of the installation. Suppress—Suppresses a reboot unless files were in use and could not be overwritten during installation. ReallySuppress—Suppresses all reboots at the end of the installation. <p>NOTE: A reboot is only forced by the Adaptec installer if you have installed the DSM feature, or if any files can't be overwritten.</p>

Example Command Line Installations

- To install the basic options, which include the GUI, Agent, Readme, and SNMP Support:

```
setup.exe /s /v"/qn ADDLOCAL=Console,Agent,,ASMReadme,SNMPSupport"
```

- To install just the Agent and suppress a reboot at the end of installation:

```
setup.exe /s /v"/qn ADDLOCAL=Agent REBOOT=ReallySupress"
```

- To install all features silently, on a machine named COMP1234, then force a reboot:

```
setup.exe /s /v"/qn ADDLOCAL=ALL USERNAME=admin PASSWORD=pass  
REBOOT=Force MGMTLOC=COMP1234 MGMTUSER=admin MGMPASS=pass"
```

Note This will install the DSM feature, which *cannot* be installed silently. You must click the Windows driver installation dialog box to successfully complete the DSM installation. (This is currently a Windows limitation.)

- To install only the CLI Tools and suppress a reboot:

```
setup.exe /s /v"/qn ADDLOCAL=CLITools REBOOT=ReallySuppress"
```

- To install the GUI feature to a different installation path:

```
setup.exe /s /v"/qn ADDLOCAL=Console INSTALLDIR="C:\Adaptec Storage Manager\"
```

- To install and have setup wait until the install finishes before it closes:

```
start /WAIT setup.exe /w /s /v"/qn ADDLOCAL=Console,Agent REBOOT=ReallySupress"
```

- To install the VDS/VSS Services with support for a remote Management Service (already installed on machine COMP1234):

```
setup.exe /s /v"/qn ADDLOCAL=VDSEExternal,VSSEExternal MGMTLOC=COMP1234  
MGMTUSER=admin MGMPASS=pass"
```

- To install a local Management Service and the VDS/VSS Services with support for this local management service on machine COMP1234:

```
setup.exe /s /v"/qn ADDLOCAL=Management Service,VDSExternal,VSSExternal  
USERNAME=admin PASSWORD=pass MGMTLOC=COMP1234 MGMTUSER=admin  
MGMPASS=pass"
```


OS Support Quick Reference

This appendix provides a quick-reference matrix of feature support by OS.

For more information about Adaptec Storage Manager features (including special system requirements), see “Planning Your IP SAN” on page 13.

iSCSI Initiator Support by OS

	Supported iSCSI Initiators						
OS with Latest Service Pack	Microsoft iSCSI Initiator 2.04 or later	Q-Logic QLA4050C HBA	Q-Logic QLA4052C HBA	Bundled Microsoft iSCSI Initiator	Bundled Cisco iSCSI Initiator	Bundled Open-iSCSI Initiator	Bundled Software Initiator
Windows OSs							
Windows Server 2003: Enterprise Edition Enterprise Edition R2 Standard Edition Standard Edition R2 Web Edition							
Windows Small Business Server 2003	✓	✓	✓				
Windows Small Business Server 2003 R2							
Windows Data Center 2003							
Windows Data Center 2003 R2							
Windows XP (All Versions)	✓						
Linux OSs							
Red Hat Enterprise Linux 4 U4		✓	✓		✓		
Red Hat Enterprise Linux 5						✓	
SUSE Linux Enterprise Server 9							
SUSE Linux Enterprise Server 10		✓	✓		✓		
VMware OSs							
ESX Server		✓	✓				✓

Adaptec Storage Manager Feature Support by OS

	Supported Adaptec Storage Manager Features					
			Windows Support Components			
OS with Latest Service Pack	GUI and Agent	Management Service	Multipath Driver	Provisioning Agent	VDS Provider	VSS Provider
Windows OSs						
Windows Server 2003: Enterprise Edition Enterprise Edition R2 Standard Edition Standard Edition R2 Web Edition	 ✓ ✓	 ✓ ✓	 ✓ ✓	 ✓ ✓	 ✓	 ✓ ✓
Windows Small Business Server 2003 R2						
Windows Small Business Server 2003 R2						
Windows Data Center 2003						
Windows Data Center 2003 R2						
Windows XP (All Versions)	✓	✓				
Linux OSs						
Red Hat Enterprise Linux 4 U5						
Red Hat Enterprise Linux 5	✓	✓				
SUSE Linux Enterprise Server 9						
SUSE Linux Enterprise Server 10	✓	✓				
VMware OSs						
ESX Server						

Term	Definition
Adaptec Storage Manager Agent	Software component that runs in the background and communicates status and other information about any Adaptec direct attached storage on a system. The Agent requires no user intervention and includes no user interface.
Administrator	A level of access privilege that allows full access to Adaptec Storage Manager, your iSCSI Storage Appliance, and your IP SAN.
alien pool	A partially configured pool, usually created as a result of an error during pool creation, such as a power failure.
Appliance Software ID	Unique number that is used to identify your iSCSI Storage Appliance, and is required when you register your iSCSI Storage Appliance, receive technical support, and redeem feature keys (software license keys). The Appliance Software ID can be found on the Device tab of the Properties window for your iSCSI Storage Appliance.
available space	Space on a disk drive that is not being used by a logical device. When a logical device is deleted, its space becomes available. <i>See also</i> logical device.
cache	A temporary, fast storage area that holds data from a slower storage device for quick access. Cache storage is normally transparent to the accessing device.
CHAP Authentication	Challenge Handshake Authentication Password Authentication, a method of restricting access to your iSCSI Storage Appliance. When CHAP is enabled, your iSCSI Storage Appliance validates the identity of systems trying to access it by sending a challenge (such as a request for a password) and authenticating the response.
DHCP	Dynamic Host Configuration Protocol. Automatically assigns dynamic IP addresses to devices, such as controllers and iSCSI Storage Appliances, on a network.
Direct Attached Storage (DAS)	A storage system, such as a disk drive or enclosure, that's directly attached to a server or workstation, not connected by a storage network. Also one branch of the Enterprise View tree in Adaptec Storage Manager. <i>See also</i> LAN, SAN.
domain name	The name given to the group of iSCSI Storage Appliances and systems that are part of the same IP SAN (share a common part of the IP address).

Term	Definition
dual drive failure protection	Another name for RAID 6 or RAID 60. See RAID 6 pool, RAID 60 pool.
email notifications	Event messages about remote systems that are emailed to selected recipients.
enclosure	Also known as a JBOD (Just a Bunch Of Disks), storage enclosure, or disk enclosure.
EUI	Extended Unique Identifier. A unique identifier used to differentiate iSCSI targets and iSCSI initiators from each other. An EUI consists of the string "eui" followed by exactly 16 hexadecimal characters.
event	Activity on your IP SAN, such as a disk drive failure or logical device verification.
fault tolerance	The ability of a system to continue to perform its functions even when one or more disk drives have failed.
firmware	A combination of hardware and software; software written onto read-only memory (ROM).
foreign pool	A pool that has been exported from its original iSCSI Storage Appliance, but hasn't yet been imported to its new iSCSI Storage Appliance.
format	See initialize.
gateway	A node on a network that controls access to another network.
GuardianOS-powered Snap Server	A non-700i Series Snap Server. See also iSCSI Storage Appliance.
GUI	Graphical User Interface. The window that opens when you start Adaptec Storage Manager. The GUI must be installed on at least one system on your IP SAN.
HBA	Host Bus Adapter. A hardware device that connects a host system, such as a workstation, to network or storage devices (such as DVD drives).
host	A system that's connected to a network.
host name	The unique name by which a network storage device (your iSCSI Storage Appliance) is known on the network.
hot spare	A spare disk drive which will automatically replace a failed disk drive in a pool.
hot-swap	Remove and replace a failed disk drive in a pool without shutting down the server or disrupting activity on the pool.
initialize	Prepare a disk drive for reading and writing.

Term	Definition
initiator	See iSCSI initiator.
IP address	Internet Protocol address. A unique number that devices use to identify and communicate with each other on a computer network that uses the IP standard.
IP SAN	Internet Protocol Storage Area Network. A collection of iSCSI initiators and targets grouped together into a network.
IQN	iSCSI Qualified Name. A unique identifier used to differentiate iSCSI targets and iSCSI initiators from each other. An IQN consists of a date code, the domain name (reversed) of the organization creating the iSCSI name, and (optionally) other unique information as required. Example: iqn.2006-08.com.adaptec.example.target.xyz
iSCSI	SCSI command blocks encapsulated in Ethernet packets and transferred over an IP network (IP SAN).
iSCSI initiator	Hardware or software that runs on a host and initiates IO to an iSCSI target. An iSCSI initiator encapsulates SCSI commands and data requests into iSCSI packets for transfer across the IP SAN. <i>See also</i> iSCSI target.
iSCSI Storage	Storage that is created, managed, and accessed over an IP SAN. Also one branch of the Enterprise View tree in Adaptec Storage Manager.
iSCSI Storage Appliance	A Snap Server 700i Series. The iSCSI initiators on your network access the iSCSI targets you create on your iSCSI Storage Appliance. <i>See also</i> GuardianOS-powered Snap Server.
iSCSI Storage Host	A system running one of these OSs that has or will have storage provisioned to it automatically: Windows Server 2003 (all versions), Windows Small Business Server 2003, Windows Data Center 2003.
iSCSI target	Storage device (in this instance, a logical device on the iSCSI Storage Appliance) that receives iSCSI requests from iSCSI initiators and sends iSCSI responses in return. <i>See also</i> iSCSI initiator.
iSNS	Internet Storage Name Service. A protocol that helps automate the discovery, management, and configuration of iSCSI devices on a TCP/IP network.
job	A multi-step task that's performed by Adaptec Storage Manager, such as creating or deleting a volume or a creating snapshot. <i>See also</i> Job Manager.

Term	Definition
Job Manager	A utility in Adaptec Storage Manager that you can use to monitor jobs as they progress. <i>See also</i> job.
LAN	Local Area Network. A network of interconnected systems sharing the resources of a single server, typically within the area of a small office building.
local system	The computer (or <i>system</i>) that you're working on. In Adaptec Storage Manager, 'local' and 'remote' are relative terms. <i>See also</i> remote system.
logical device	One or more disk drives grouped together to appear as a single device to an OS. Also known as a logical drive.
managed system	A computer (or <i>system</i>) with direct attached storage that's being managed by Adaptec Storage Manager.
Management Service	A component of Adaptec Storage Manager that coordinates and enables communication between your iSCSI Storage Appliance and the iSCSI Storage Hosts on your IP SAN. The Management Service also: monitors your iSCSI Storage Appliance and IP SAN; generates event alerts when activity, errors, or failures occur; controls access to Adaptec Storage Manager and your IP SAN; monitors jobs in progress and can schedule jobs to occur at a future time. Similar to the Agent, the Management Service runs in the background, requires no user intervention, and includes no user interface. You must install the Management Service on at least one system on the same subnet as your iSCSI Storage Appliance.
mirror manager	A volume that is being mirrored. <i>See also</i> mirroring, mirror plex.
mirror plex	A mirror copy of a volume. <i>See also</i> mirroring, mirror manager.
mirroring	<p>In RAID technology, data protection that duplicates all data from one drive onto a second drive. <i>See also</i> Two disk drives, where one disk drive is a mirror of the other (the same data is stored on each disk drive)..</p> <p>In Adaptec Storage Manager, a feature that lets you create a copy of a volume. When a volume is <i>mirrored</i>, a second volume residing on second iSCSI Storage Appliance is used to duplicate the data on the volume. <i>See also</i> mirror manager, mirror plex.</p>

Term	Definition
MPIO DSM	<p>Multipath I/O Device Specific Module. A component of Adaptec Storage Manager that allows you to set up multiple redundant physical paths between your iSCSI Storage Appliance and your iSCSI Storage Hosts. In a multipath IP SAN, if one path fails, all IO activity automatically switches over (<i>fails over</i>) to the remaining path. A component of the Windows Support installation option in Adaptec Storage Manager; must be installed on all iSCSI Storage Hosts on your IP SAN <i>if</i> you want to create volume mirrors or a multipath IP SAN. See <i>also</i> Windows Support.</p> <p>Note Adaptec Storage Manager supports failover only. Load balancing is not supported.</p>
netmask	A unique number that identifies the subnet on which device, such as your iSCSI Storage Appliance, resides.
operator	A level of restricted user permission that doesn't allow full access to all features of the iSCSI Storage Appliance.
parity	A form of data protection used by some RAID levels to re-create the data of a failed disk drive in a logical device. See <i>also</i> Two disk drives, where one disk drive is a mirror of the other (the same data is stored on each disk drive)..
partition	Divides the space of a disk drive into isolated sections.
physical device	A physical storage devices such as a disk drive, tape drive, or iSCSI Storage Appliance.
pool	A pool is a disk drive or collection of disk drives which can be divided into logical devices, which then become the iSCSI targets that are accessed by the iSCSI initiators in your IP SAN systems. Also known as a <i>storage pool</i> .
Provisioning Agent	A component of Adaptec Storage Manager that automates functions on iSCSI Storage Hosts such as volume and snapshot creation. A component of the Windows Support installation option in Adaptec Storage Manager; must be installed on all iSCSI Storage Hosts on your IP SAN if you want to be able to provision storage automatically and access other automated features. See <i>also</i> Windows Support.
RAID	Redundant Array of Independent Disks.
RAID 0 pool	Two or more disk drives with <i>striped</i> data (data distributed evenly across the disk drives in equal-sized sections). RAID 0 does not provide data protection.
RAID 1 pool	Two disk drives, where one disk drive is a <i>mirror</i> of the other (the same data is stored on each disk drive).

Term	Definition
RAID 1E pool	Similar to RAID 1 except that data is both mirrored <i>and</i> striped, and more disk drives can be included. A RAID 1E pool can be built from three or more disk drives. Also referred to as a <i>striped mirror</i> .
RAID 10 pool	Built from two or more equal-sized RAID 1 pools. Data in a RAID 10 pool is both striped and mirrored.
RAID 5 pool	A minimum of three disk drives, with data striping and parity data to provide redundancy. <i>See also</i> parity.
RAID 50 pool	Built from six to forty-eight disk drives configured as two or more RAID 5 pools. Stripes stored data and parity data across all disk drives in both RAID 5 pools.
RAID 6 pool	Similar to a RAID 5 pool because it uses data striping and parity data to provide redundancy. However, RAID 6 pools include <i>two</i> independent sets of parity data instead of one. Both sets of parity data are striped separately across all disk drives in the pool. Also referred to as <i>dual drive failure protection</i> .
RAID 60 pool	Built from eight disk drives configured as two or more RAID 6 pools. Stripes stored data and two sets of parity data across all disk drives in both RAID 6 pools. Also referred to as <i>dual drive failure protection</i> .
rapid fault isolation	In Adaptec Storage Manager, the trail of yellow or red warning icons that leads from the high-level system view to the failed or failing component.
rebuild	Re-create a logical device after a disk drive failure.
recurring job	A scheduled job, such as snapshot creation, that occurs on a regular basis. <i>See also</i> scheduled job.
redundancy	The capability of preventing data loss if a disk drive fails. <i>See also</i> mirroring, parity.
remote system	In Adaptec Storage Manager, all other systems with direct attached storage besides your local system are remote systems. 'Local' and 'remote' are relative terms. <i>See also</i> local system.
SAN	Storage Area Network. A storage architecture that connects servers and disk drives across a network for enhanced reliability, scalability, and performance.
scheduled job	Activity, such as snapshot creation, that is set to be completed at a specified date and time. <i>See also</i> redundancy.
scope	One or more iSCSI initiators that can access the same iSCSI target(s). iSCSI initiators are often grouped together in scopes by function or department.

Term	Definition
SMTP	Simple Mail Transfer Protocol.
snapshot	A frozen image of a volume at a particular point in time.
SNMP trap notifications	TBD
spare	See hot spare.
SRP Authentication	Secure Remote Password, a method of restricting access to your iSCSI Storage Appliance. When SRP is enabled, a system trying to access your iSCSI Storage Appliance must provide the correct password to authenticate its identity.
storage pool	See pool.
stripe size	Amount of data written to one partition before the controller moves to the next partition in a stripe set.
striped mirror	A RAID 1 Enhanced, or RAID 1E, logical device.
striping	A method of enhancing performance by spreading data evenly over multiple disk drives. Provides no data protection.
target	See iSCSI target.
verify	Check a logical device for inconsistent or bad data. May also fix any data problems or parity errors.
VDS Provider	<p>Virtual Disk Service Provider. A component of Adaptec Storage Manager that lets you configure a mixed storage environment—a network with both Adaptec and non-Adaptec storage devices—from single user interface without using management tools from each storage vendor. A component of the Windows Support installation option in Adaptec Storage Manager; must be installed on all iSCSI Storage Hosts on your IP SAN if you have a mixed storage environment.</p> <p>Not all OSs support the VDS Provider. See “Adaptec Storage Manager Feature Support by OS” on page 211 for more information. See also Windows Support.</p>
volume	Storage that has been fully provisioned to an iSCSI Storage Host on your IP SAN. A volume has a drive letter, and has been formatted for data storage.

Term	Definition
VSS Provider	Volume ShadowCopy Service Provider. A component of Adaptec Storage Manager that lets you create application- and file-consistent point-in-time copies (true data snapshots) of the volumes on your iSCSI Storage Hosts. A component of the Windows Support installation option in Adaptec Storage Manager; must be installed on all iSCSI Storage Hosts on your IP SAN if you want to be able to back up your data with snapshots. <i>See also</i> snapshot, Windows Support.
Windows 2003	Collective term for Windows Server 2003 (all versions), Windows Small Business Server 2003, and Windows Data Center 2003 operating systems.
Windows Support	Windows Support is a collection of enhanced Adaptec Storage Manager components that can be installed on iSCSI Storage Hosts only. Windows Support comprises these components: MPIO DSM (Multipath Driver), Two disk drives, where one disk drive is a mirror of the other (the same data is stored on each disk drive)., VDS Provider, and VSS Provider.

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